

COMPUTING FOR BUSINESS

INTERFACE AGETM

OCTOBER 1982 \$2.50 • CANADA/MEXICO \$3.00

HOW TO SELECT INVENTORY SOFTWARE



SYSTEM REVIEWS:

North Star
Toshiba
Commodore

Understanding the Telecommuting Phenomenon



FDC SBC

SYSTEMASTER®

The Next Logical Step

Teletek FDC-I, The First Step

A CPU, floppy disc controller and I/O all on one board. Until SYSTEMASTER® the most powerful IEEE-S-100 board on the market.

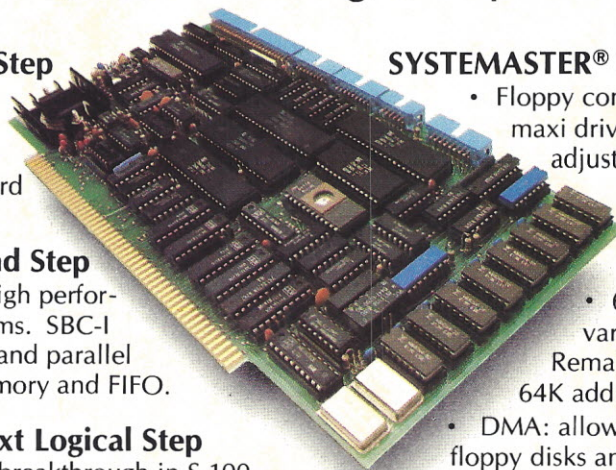
Teletek SBC-I, The Second Step

A board designed for use in high performance, multiprocessing systems. SBC-I combines its own CPU, serial and parallel ports, 128K of segmented memory and FIFO.

SYSTEMASTER®, The Next Logical Step

Teletek's newest product — a breakthrough in S-100 board design. SYSTEMASTER® is a complete system. No other boards are required. It doesn't even require a bus!

But, when used with an S-100 bus, SYSTEMASTER® has even more capabilities. You can readily expand to multi-user or multi-processor systems using SYSTEMASTER® as the master board.

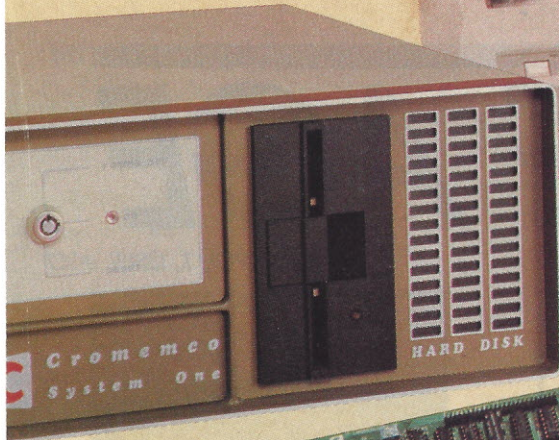


SYSTEMASTER® Features:

- Floppy controller: controls mini and/or maxi drives; variable independently-adjustable pre-write compensation.
- CPU: 4MHz Z80A
- Two RS-232C ports.
- Two full parallel ports.
- 64K bank-selectable memory variable from 32K to 60K. Remaining memory is fixed at top of 64K address space.
- DMA: allows transparent data transfer to floppy disks and other devices without CPU wait states.
- Relocatable EPROM/ROM/PROM: 2K, 4K or 8K with deselect capability.
- Real-time clock.
- Operating systems available: Digital Research or Turbodos.
- Parallel ports may be connected to Teletek's PSC board for RS-422 capability.

TELETEK

CIRCLE 81 ON INQUIRY CARD

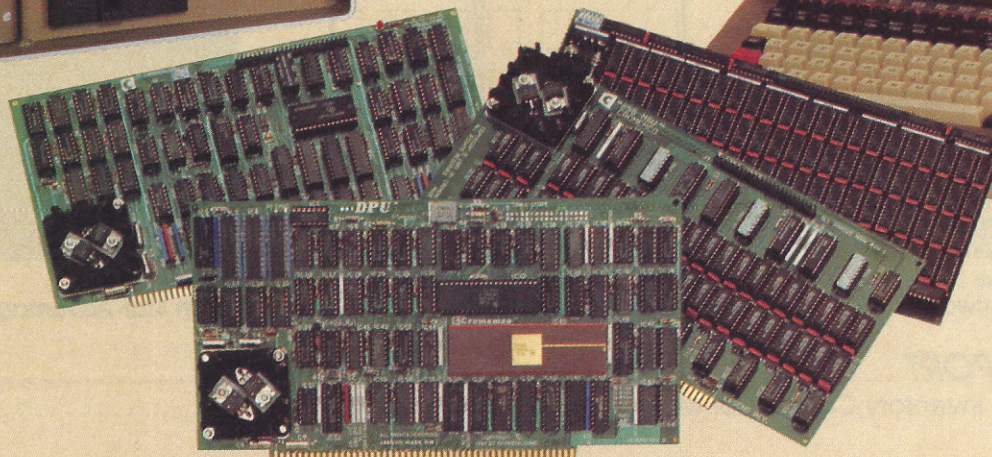


System One CS-1H

3715 Printer



3102 Terminal



DPU card with error-correcting memory and controller cards

POWERFUL NEW MICRO. POWERFUL SOFTWARE.

68000-POWERED FOR TOMORROW

Once again you get a big stride forward with Cromemco.

This time it's our new DPU Dual Processor Unit. It gives enormous power to Cromemco computer systems such as our System One shown here.

COMPARES WITH MAINFRAMES

With the new DPU you get the almost unbelievably powerful 68000 processor and its 32-bit data-handling capabilities combined with its **16 Megabyte** address space.

In other words with the System One/DPU combination you get a small machine that's the equal of superminis and mainframes in some areas.

8-BIT AND 68000 SOFTWARE

The dual part of the DPU refers to its on-board Z-80A processor. With this you have access to existing CP/M* software.

But besides being compatible with this wealth of existing 8-bit software, the System One/DPU has available a whole family of new 68000 system software. This includes a wide range of high-level

software such as our 68000 Assembler, FORTRAN 77, Pascal, BASIC, COBOL, and C.

Beyond all this there's a version for the 68000 of our widely admired CROMIX† Operating System. It's like UNIX‡ but has even more features and gives multi-tasking and multi-user capability. In fact, one or more users can run on the Z-80A processor while others are running on the 68000. Switching between the Z-80A and 68000 is automatically controlled.

The System One itself is a bus-oriented machine that has options for color graphics, for 390K or 780K of floppy storage, a 5 MB hard disk option, communications capability, and multi-processor capability using our I/O processor card.

HIGHLY EXPANDABLE

With the System One/DPU combination, you get tremendous expandability. Right now you can have up to 2 MB of RAM storage. You get this with our new Memory Storage cards and our Memory Controller. The Controller fully supports the 16 MB storage space of the 68000,

allowing you vast future expansion capability.

Further, the memory has built-in **error detection** and **correction**, a feature normally found only in much more costly systems.

Present customers can field-upgrade their Cromemco systems to use the DPU and still be able to run their present software using the Z-80A on the DPU. It's one more instance of Cromemco's policy of providing obsolescence insurance for Cromemco users.

LOW PRICED

With all this performance you might not be ready for the low price we're talking about. With 256K of RAM and 780K of floppy storage, the price of the System One/DPU is only \$5495. Yes, that's hard to beat.

So contact your rep now. He'll fill you in on the many more features that this outstanding and powerful machine offers.

*CP/M is a trademark of Digital Research

†CROMIX is a trademark of Cromemco, Inc.

‡UNIX is a trademark of Bell Telephone Laboratories



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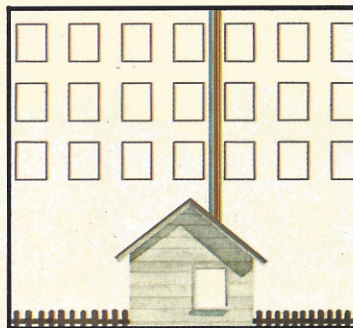
INTERFACE AGE

OCTOBER 1982

VOL 7, ISSUE #10



Buyer's Guide to
Inventory Software44



Telecommuting: Toward
an Extended Office60



Reviewing the
North Star Advantage68

SPECIAL REPORT

Buyer's Guide: Inventory Control Software44

REVIEWS

| | |
|--|-----|
| Assignment: Benchmark/Commodore CBM 8032 | 39 |
| JRT Pascal, Version 2 | 118 |
| North Star Advantage | 68 |
| Phase One Systems' Control | 124 |
| Q.I.S.'s Spellproof | 106 |
| Sensible Speller | 82 |
| Sinclair ZX81 | 92 |
| S.B.C.S. General Ledger | 122 |
| Toshiba T250 | 98 |
| Two Index Card Programs for the Apple | 104 |

APPLICATIONS

| | |
|--|-----|
| Telecommuting: Toward an Extended Office | 60 |
| Screen Writer | 114 |

IMPLEMENTATION

| | |
|--|-----|
| Installing a Micro: The Hidden Costs | 112 |
|--|-----|

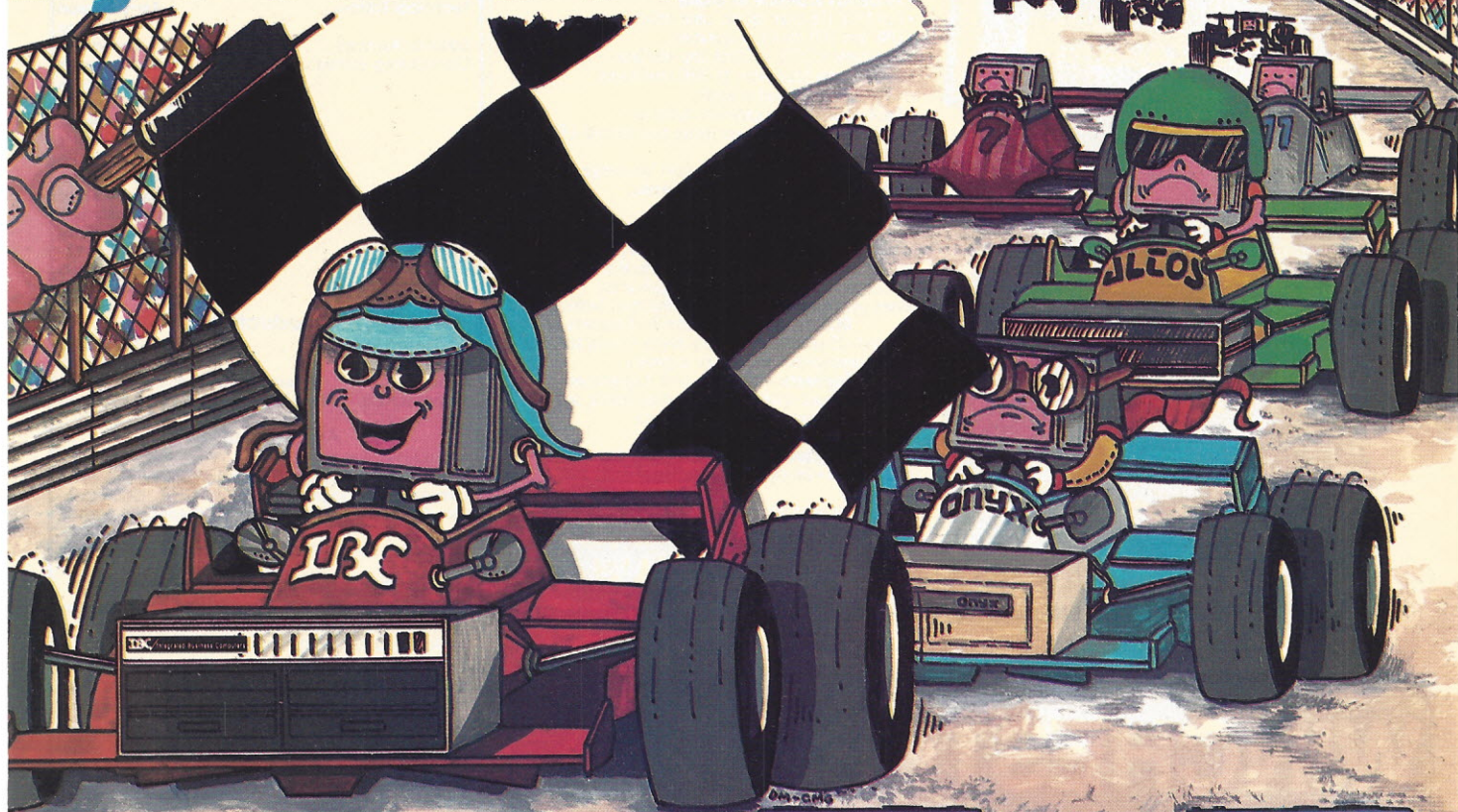
| | | | |
|----------------------------|-----|----------------------------------|-----|
| <i>Editorial</i> | 6 | <i>Word Processing</i> | 23 |
| <i>Opinion</i> | 12 | <i>Data Communications</i> | 26 |
| <i>Letters</i> | 17 | <i>Education</i> | 32 |
| <i>Calendar</i> | 18 | <i>Portables</i> | 34 |
| <i>Entertainment</i> | 151 | <i>Product Highlight</i> | 14 |
| <i>Books</i> | 152 | <i>New Products</i> | 128 |
| <i>Miscellany</i> | 154 | <i>Update</i> | 8 |

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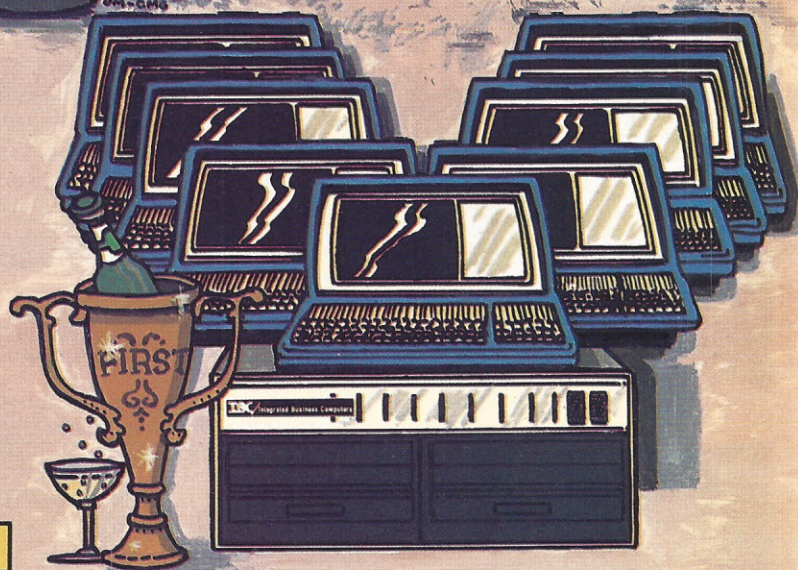
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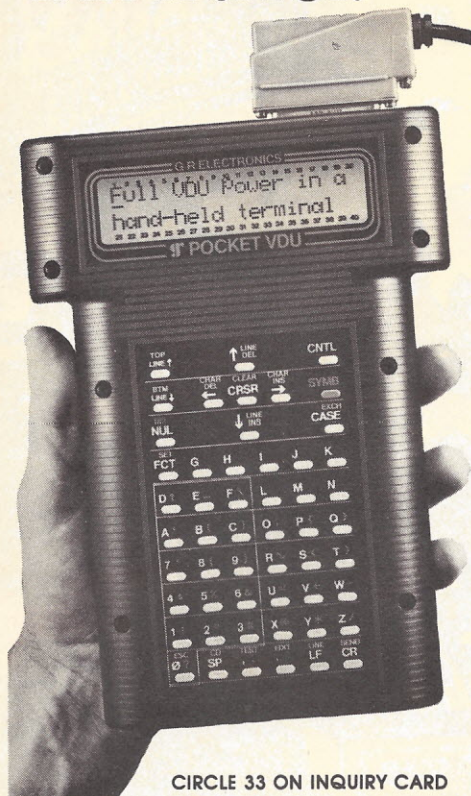
Engineers: • In-system fault diagnosis on processor-based systems • Interrogation, debug, and status monitoring • Bench testing • Data collection/retrieval.

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Some computers have a vertical format for word processing. Still others offer a horizontal format for spread sheets.

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Whole-page word processing and 13-column one-glance forecasting. No need for scrolling. And no need to resort to a printer.

The Seybold Office Systems Report (June 1982) called it "The most impressive new desk-top computer" at the 1982 Hannover Fair. Byte Magazine (June 1982) said "It will set the price/performance standard in its price class for some time to come."

Besides its dual orientation screen, the Concept has set the pace in memory

capacity with 256 thousand bytes (expandable to 512 kilobytes).

And it's designed to grow with your needs. Every Concept has a built-in network interface that transforms it from a powerful stand-alone computer to a versatile, multi-function workstation on an interactive peripheral-sharing network.

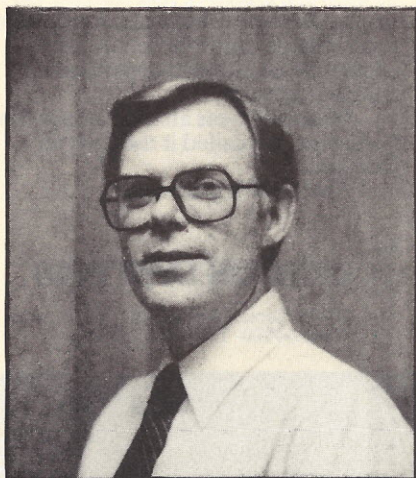
Because it was an idea whose time had come, we called it the Corvus Concept.

You'll call it a miracle.

★★ CORVUS SYSTEMS

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Terry Benson
Technical Editor

If you are about ready to invest some business profits into a personal computer, you would do well to consider investing an additional 5-10% for complete system integration. The problem is that many of the dominant manufacturers of small business computer systems do not—or perhaps cannot—support the implementation of the *total* system.

If your requirements dictate special needs or characteristics—of either hardware or software—it is likely that you will not be able to accommodate your requirements by purchasing all elements from one vendor. I was recently involved in a situation where the requirements were clearly defined and several manufacturers were asked to propose a system. Eight of the ten companies responding did so through a third party. In some cases, the company that responded was merely a representative for the manufacturer; in other cases, it was more of a custom software house that specialized in a particular manufacturer's product.

It turns out that very few manufacturing companies are able to support a complete system and, therefore, would put the burden on the potential user to configure the system according to his own requirements. This may cause problems for the uninitiated computer user, requiring him to make sure that he not only has the correct components such as mainframe, disk drives, terminal and printer, but also the necessary cables with correct pin-to-pin wiring that will allow the system to operate correctly. Many buyers assume that a disk drive will plug into a disk controller and work properly. More frequently, a printer is attached to a printer port—but it won't print! Don't assume that all hardware is completely interchangeable.

Another difficulty that many potential and current users run into is that ordering the operating system from a software house, independent of the selected hardware, can lead to time-consuming phone calls (at best) or disastrous results (at worst). This software problem holds true not only for the decision on which operating system to choose, but also on the accompanying language translators and application software. The mere fact that a given system operates with CP/M does not guarantee that a CP/M-compatible software product will operate on the target system without some user modifications. In particular, the proper media format must be specified if there is any hope to generate correctly in the chosen system.

As with any consumer product, specials can be found that, on the surface, appear to save the buyer a significant amount of money. However, the time in adapting or correcting the new product to the user's system sometimes will eat up more than the original anticipated savings. Investigate before you buy. See if other users with the same operating system and hardware configuration were successful in implementing the new product.

For the businessperson who feels self-education on a system is an acceptable approach, training may not be necessary, but in situations where many people will be using the system, it would do well to invest in some specialized training on the use of the system. It is sometimes difficult to obtain specialized training—particularly when a system has been configured, maybe inappropriately, by the user. Training may only be available on one or two elements of the system, since no one person is familiar with the entire system.

This same predicament occurs when considering maintenance. It is not cost-effective to use multiple sources for maintenance, but one service may not be familiar with all of your products.

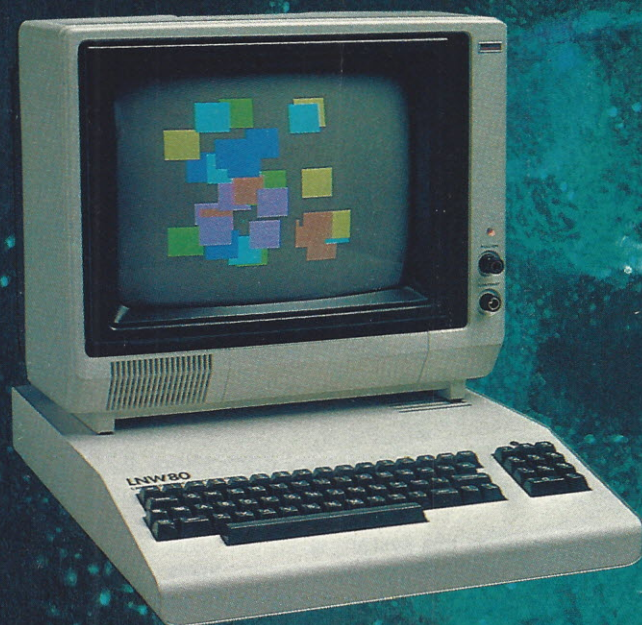
These comments are not intended to frighten anyone, but are stated as a word of caution when selecting the proper computer components. The manufacturers of computer products can recommend capable integration companies and consultants to assist in the selection of the right components for a small business computer and in the proper integration of the hardware and software. Don't be misled by the low cost claims made by some suppliers unless you are well acquainted with all elements of the system before you buy.

Terry Benson

OCTOBER 1982

GALAXY OF FEATURES

A **GALAXY** of features makes the **LNW80** a remarkable computer. As you explore the **LNW80**, you will find the most complete, powerful, ready to run, feature-packed personal and business computer ever made into one compact solid unit.



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FULLY LOADED – A full payload includes an on-board single and double density disk controller for 5 1/4" and 8" single or double sided disk drives. RS232C communications port, cassette and parallel printer interfaces are standard features and ready to go. All memory is fully installed – 48K RAM, 16K graphics RAM and 12K ROM complete with Microsoft **BASIC**.

CIRCLE 49 ON INQUIRY CARD

QUALITY CONSTRUCTION – Instrumentation quality construction sets **LNW80** computers apart from all the rest. Integrated into the sleek solid steel case of the **LNW80** is a professional 74-key expanded keyboard that includes a twelve key numeric keypad.

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Monitor and Disk drives not included
TM Personal Software, Inc.

Reader's Digest enters software development

Reader's Digest Services (Pleasantville, NY)—the Reader's Digest Association's personal computer software publishing division—is contracting with software development firms for specific programs; entering joint development agreements with major personal computer hardware manufacturers; and offering an outside author/software publishing plan.

The company has development arrangements with Apple Computer, Inc. (Cupertino, CA) and Tandy Corp. (Fort Worth, TX).

Programs will be designed to be as easy-to-use as possible and will offer both first-time and experienced users a wide range of business, home entertainment and educational applications.

As part of its software development effort, submissions are sought from authors who've written programs for personal computers. If accepted, the programs would be published and marketed by the Digest under a royalty agreement with the author.

Osborne announces credit card program

Osborne Computer Corporation (Hayward, CA) has developed a National Accounts Sales Program that employs credit cards for purchase of service and supplies for the Osborne 1 portable computer.

The Osborne Major Accounts Group (OMAG) program is intended to aid the business traveler.

The plan is designed primarily for large corporate accounts. OMAG dealers are comprised of a cross section of Osborne's retail, ISO and OED dealers. The 200 international stations will be selected based on geographic location and outside service capabilities.

CBS and AT&T to conduct videotex trial

CBS Inc. (New York, NY) and the American Telephone and Telegraph Co. (New York, NY) are jointly testing a videotex computer-based home information system. It will involve a total of 200 households in Ridgewood, NJ. CBS will be responsible for information content and AT&T will provide computer facilities and home terminals (PDP 11/70s from DEC). Telecommunications facilities will be obtained from New Jersey Bell. Such systems enable people in their homes to get information and perform other interactive functions using specially equipped television sets connected to telephone lines. Leading financial and industry experts expect videotex to be a \$10 billion-a-year business by 1990.

Stock market bulletin board is introduced

Tickerscreen (New York, NY) is a service available free to investors with personal computers. It provides closing New York stock exchange prices, closing market indexes and commission computation on any stock or option transaction.

One can access Tickerscreen for the cost of a local call. Entry to the system is simple. The user dials (213) 986-1660 and connects his personal computer, videotex or communications terminal to his phone.

Sears to market Sharp PC-1500

The recently introduced PC-1500 Pocket Computer and the CE-150 four-color printer/cassette interface will receive a broad distribution through Sears Business Retail Stores across the nation.

The PC-1500 is Sharp's newest handheld computer. With the CE-150 printer/cassette interface, it can print in four colors, produce graphs, charts, pictures and more.

Sears opened five of its free-standing Business System Centers last fall and will open an additional 45 centers before 1983.

National Semiconductor to sell Dynabyte computers

Dynabyte Business Computers (Milpitas, CA) has signed a multiyear contract with National Semiconductor (Santa Clara, CA)—with an estimated value in 1983 of up to \$4,000,000. The contract calls for Dynabyte to supply National Semiconductor with the recently-introduced 16-bit/8-bit Monarch systems—as well as systems from the current 8-bit Series 5000.

Monarch's design of both an 8-bit and 16-bit processor—plus bisynchronous communications and advanced diagnostic software—have been integrated into a high performance system capable of serving up to 16 users simultaneously.

Corvus Systems inks CP/M pact with Digital Research

Corvus Systems (San Jose, CA) announced that it has signed a licensing agreement with Digital Research (Pacifica Grove, CA) for use of the CP/M operating system. Corvus plans to offer this operating system as an option on its Concept workstation, providing access to more than 2,000 CP/M programs.

Plot your next meeting yourself.

Read how 2 pens can become
your best presentation tools.

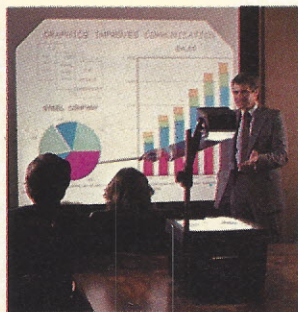
Introducing the New Personal Computer Plotter from Hewlett-Packard.

Now you can use your personal computer to generate your own presentation charts, graphs, and pie charts. How? Simply add on the new high quality, low cost HP 7470A Personal Computer Plotter.

The 7470A helps you save time and save money, and lets you communicate quickly, accurately and *effectively*.

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Data, when visualized graphically, becomes information fast. Charts and bar graphs can make any presentation clearer and more readily understood. But asking your staff to produce the graphics manually for your next presentation doesn't ensure accuracy or artistic talent. And going to outside graphics suppliers can be costly. Combined with your personal computer, the new HP 7470A plotter does the communicating for you. Quickly. Logically. And with off-the-shelf software available from most HP dealers.



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The HP 7470A has two single-pen stables.

Simple pen changes give you multi-color plots in your choice of ten coordinated colors. Pens are automatically capped and stored.

An option you'll want, too.

For only \$95, you can also get a 17057 Overhead Transparency Kit that turns your plots into transparencies for overhead projectors. For "I need it tomorrow at 9:00 A.M.!" meetings, it's a necessity.

Start plotting your next presentation today. Clip and mail the coupon below. Now.

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But be advised.

Our expectations are great.

Because the software we publish must be good enough to complement IBM Personal Computer hardware. In fact, the more you take advantage of all our hardware capabilities (see the box at right), the more interested in your software we become.

Think about incorporating color graphics into your program, for example.

Use sound. Consider the power of our keyboard and remember to utilize the ten programmable function keys.

In all cases, we're interested in "friendly" software—with emphasis on quality and wide appeal. Programs with the greatest chance of being published must be easy to use, offer a better way to accomplish a task and provide something special to the user.

What kinds of programs? All kinds.

Education. Entertainment. Personal finance. Data management. Self improvement. Games. Communications. And yes, business.

We select programs that will make the IBM Personal Computer an even more useful tool for modern times.

IBM PERSONAL COMPUTER SPECIFICATIONS

| | | |
|--|---|--|
| User Memory 16K-256K bytes* | Display Screen High-resolution* 80 characters x 25 lines Upper and lower case Green phosphor screen* | Permanent Memory (ROM) 40K bytes* |
| Microprocessor 16-bit, 8088* | | Color/Graphics <i>Text mode:</i> 16 colors* |
| Auxiliary Memory 2 optional internal diskette drives, 5¼" 160K bytes or 320K bytes per diskette | Operating Systems DOS, UCSD-p System, CP/M-86† | Graphics mode: 4-color resolution: 320h x 200v* Black & white resolution: 640h x 200v* |
| Keyboard 83 keys, 6 ft. cord attaches to system unit* | Languages BASIC, Pascal, FORTRAN, MACRO Assembler, COBOL | Simultaneous graphics & text capability* |
| 10 function keys* 10-key numeric pad Tactile feedback* | Printer Bidirectional* 80 characters/second 12 character styles, up to 132 characters/line* | Communications RS-232-C interface Asynchronous (start/stop) protocol Up to 9600 bits per second |
| Diagnostics Power-on self testing* Parity checking* | 9 x 9 character matrix* | |

*ADVANCED FEATURES FOR PERSONAL COMPUTERS

So, if you think your software is the best, consider submitting it. If it's accepted, we'll take care of the publishing, the marketing and the distribution. All you have to do is reap the benefits of our new royalty terms. And you're free to market your program elsewhere *at any time* even if you license it to us.

We're offering the ladder. Think about taking the first step.

For information on how to submit your program, write: IBM Personal Computer,

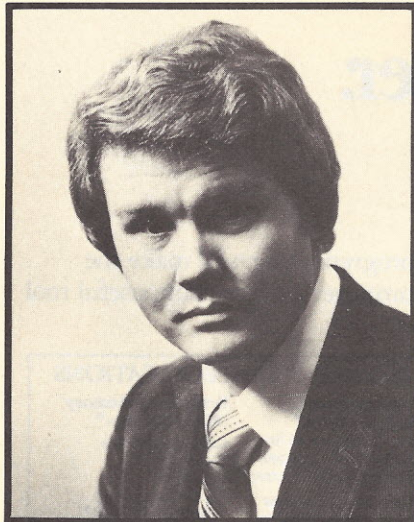
External Submissions,
Dept. 765 PC, Armonk,
New York 10504.

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an authorized IBM Personal Computer dealer near you (or information from IBM about quantity purchases) call 800-447-4700. In Illinois, 800-322-4400. In Alaska or Hawaii, 800-447-0890. SD p-System is a trademark of the Regents of the University of California. CP/M-86 is a trademark of Digital Research, Inc.



John Rowley
Chief Operating Officer
Digital Research Inc.

Information processing power in corporations is becoming more decentralized. Managers often have discretionary budgets that permit the purchase of microcomputers for their own departments. Centralized data processing departments will always be needed to do financial reporting and payroll applications, but microcomputers on managers' desks can make corporate data more useful in independent office divisions.

With the benefits come inherent risks, however. The security of a corporate database becomes harder to control. Traditionally, a centralized data processing department has controlled the flow of information processing and data was relatively secure. But now, the proliferation of microcomputers, communications links, and interchangeable storage media allow a variety of personnel to access the database.

In addition to security problems, the presence of personal microcomputers in organizations can lead to a lack of information transferability and compatibility among machines in neighboring departments. Data files and programs cannot be transferred among them, and operators must learn how to use each different machine.

If an organization allows managers to purchase desktop systems haphazardly, the costs of information processing will invariably be increased. Extra hardware and software will be needed to transfer files. Training time for operators will be significantly longer and the lack of a standard method for controlling the flow of information will create redundant operations among the functional departments. It will also cause duplication of effort between these diffused departments and the central data processing group.

I saw this problem first-hand when working at Tektronix several years ago. The company was decentralizing CAD/CAM operations, and each department independently purchased its own CAD/CAM system. Each system was different and unable to interface with the others. Ultimately, the unregulated transition more than doubled information processing costs.

Standardizing on a particular set of systems software can solve both incompatibility and security problems. The same languages and the same operating system should be implemented on all microcomputers throughout the organization. This gives all users uniform file structure, data format compatibility and the same interface with each machine. That means all users will have a consistent range of available application programs. The information that results from using the program can be shared via one compatible communications link or simply by taking a diskette from one machine to the other. Standard systems software means that operators can use any microcomputer in the organization without time-consuming indoctrination periods.

In addition, security can be maintained throughout the system by implementing the several levels of password protection available with many advanced operating systems. A central group can be responsible for locking out files in the database from unqualified personnel.

Data processing managers should begin by ensuring that purchasing standards are met by managers acquiring microcomputers. The machines need not be identical, but they should have compatible disk formats and run the same operating systems and languages. This standardized software will facilitate information transferability and security.

Choosing one set of systems software will lead to dramatic benefits for an organization. Managers can increase productivity and job satisfaction by using desktop systems to quickly add their input, their processing and their ideas to information from the corporate database. The quality of the resulting plans, reports, forecasts and budgets should increase along with the speed with which they are generated. The bottom line from this improvement in product continuity is a more profitable organization.

DELETE SCROLL
 SHOW VERIFY
 CRYPT COPY V
 EFIX DUMP CPU
 IOBYTE RENAME

RECOVER ERASED FILES

FILEFIX™ is a program for recovering erased files, protecting, deleting and renaming files, as well as forging multiple user links to a single CP/M file.

FILEFIX can perform several different operations on your CP/M directory. The directory can be viewed in detail, accidentally erased files will be identified and may easily be recovered. All operations are performed on the directory itself; data in the actual files will not be altered.

With FILEFIX you may:

- View your CP/M directory block allocation map
- Display your files in short form—including ERASED files
- Display your files in long form with block and sector status
- Display your disk status completely.

With FILEFIX it's easy to PROTECT a file and CLEAN erased files or FORGE multiple user links to the same file. You may also give several files with the same name, UNIQUE NAMES.

Formats: 8" single density IBM soft-sectored, 5¼" NorthStar, Micropolis Mod II, Superbrain 3.0, Apple II with CP/M, Osborne-1, 5¼" and 8" Xerox 820.

CPM is a trademark of Digital Research.
 Filefix™ is a trademark of Alan R. Miller, PhD.

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FILEFIX is menu driven and easy to use for the novice as well as the experienced CP/M user. Your FILEFIX disk will not only allow you to recover erased files in the directory—several utilities are provided which allow you to SCROLL or SHOW textfiles one screenful at a time, ENCRYPT files with a one or two letter password, COPY files, RENAME files, VERIFY files and determine the CPU processor type in your computer. Experienced hackers will enjoy the DUMP facility which includes both HEX and ASCII values. GO may be used to branch to any memory location and IOBYTE allows the user to reassign the four logical devices to various physical devices by changing the IOBYTE HEX value.

Everyone will eventually erase a file accidentally. With FILEFIX you do not spend valuable time starting all over because you have "mistake insurance."

FILEFIX is \$100.00 and works with CP/M 2.2



Wang Professional Computer

The new Professional Computer from Wang (Lowell, MA) is based on the Intel 8086 microprocessor and utilizes full 16-bit architecture.

Physical packaging consists of a lightweight 6.5-in. wide by 14.6-in. high by 22.6-in. deep electronics enclosure. The 101-key keyboard is enclosed in a low profile 1.2-in. high ergonomic detachable case. It includes a programmable speaker that can produce three simultaneous tones. The display screen sits on a pedestal base, allowing the user to tilt and rotate the device for optimum viewing position.

The computer comes equipped with 128K bytes of parity-checked memory for user programs; three-channel direct memory access capability; a program-addressable internal clock; an RS-232C asynchronous interface that supports both serial devices and communications; a Centronics-compatible parallel printer interface; and a standard 320K-byte, 5.25-in. floppy diskette drive that reads and records at 48 tracks per inch.

The capabilities of the basic unit can be expanded through options installed in five slots. Memory can be increased to 640K bytes. Even with maximum memory, only one of the five expansion slots is used. An optional, second floppy diskette drive with 320K bytes of additional storage capacity, or a 5.25-in. Winchester fixed drive with 5M bytes of additional formatted storage, are also available.

Included in the standard system is the Wang-enhanced version of Microsoft's MS-DOS and Microsoft's Basic-86 interpreter. The popular CP/M 80 operating system can also be emulated via a PC CP/M 80 card based on a Z80 processor.

Four standard and pre-packaged configurations of the Professional Computer can be ordered. These packages are delivered pre-assembled so the customer does not have to plug in any adapter boards, but all modules are designed to be set up and installed easily by the user if necessary for aftermarket system growth.

The Base System Unit (Model PC001) is priced domestically at \$2,695. The first standard configuration (Model PC002) is \$3,395; the second (Model PC003) is \$4,345; the third (Model PC004) is \$5,095. The fourth configuration for the business professional and manager requiring an integrated system with a stress on data processing usage (Model PC005) is \$8,945.

Hardware options provide a communications interface and local workstation emulation of either a VS, OIS, 2200 or Alliance. Optional output devices include a daisywheel printer that operates at 20 cps, and an 80 cps dot matrix printer that supports graphics output and a single sheet feeder.

For video output, the user has the option of connecting a hi-res monochromatic display, the customer-supplied color or black-and-white monitor, or a color or black-and-white home television.

Electronic spreadsheet capabilities are available via PC-Multiplan. It can also utilize Wang's Mailway electronic mail and message system as well as PC-Word Processing, a version of Wang Word Processing. In addition to proprietary software, there is an assortment available from third party vendors. Much of the software that has been written for the IBM personal computer for use under PC DOS can be read by the Wang—provided the diskette is compatible.

Other software options include asynchronous communications support for teletype protocols and Wang workstation emulation. As an asynchronous or synchronous data processing workstation, the computer supports both batch and interactive communication protocols, including the 3270, 2780/3780, and SNA, and will support X.25, X.21 and Teletex. It can also function as a workstation through Wang's Remote Networking Facility, and will have WangNet capabilities in the future.



The Wang Professional Computer is an integrated and versatile office automation tool, incorporating data processing, word processing, image processing and networking factors.

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word processor for the IBM
Personal Computer.**

**Now, these EasyWriter™ owners
are looking for an
extraordinary spell-checker.**

**EasySpeller™
The 88,000 word, letter perfect,
vocabulary program.**

Don't keep them waiting.



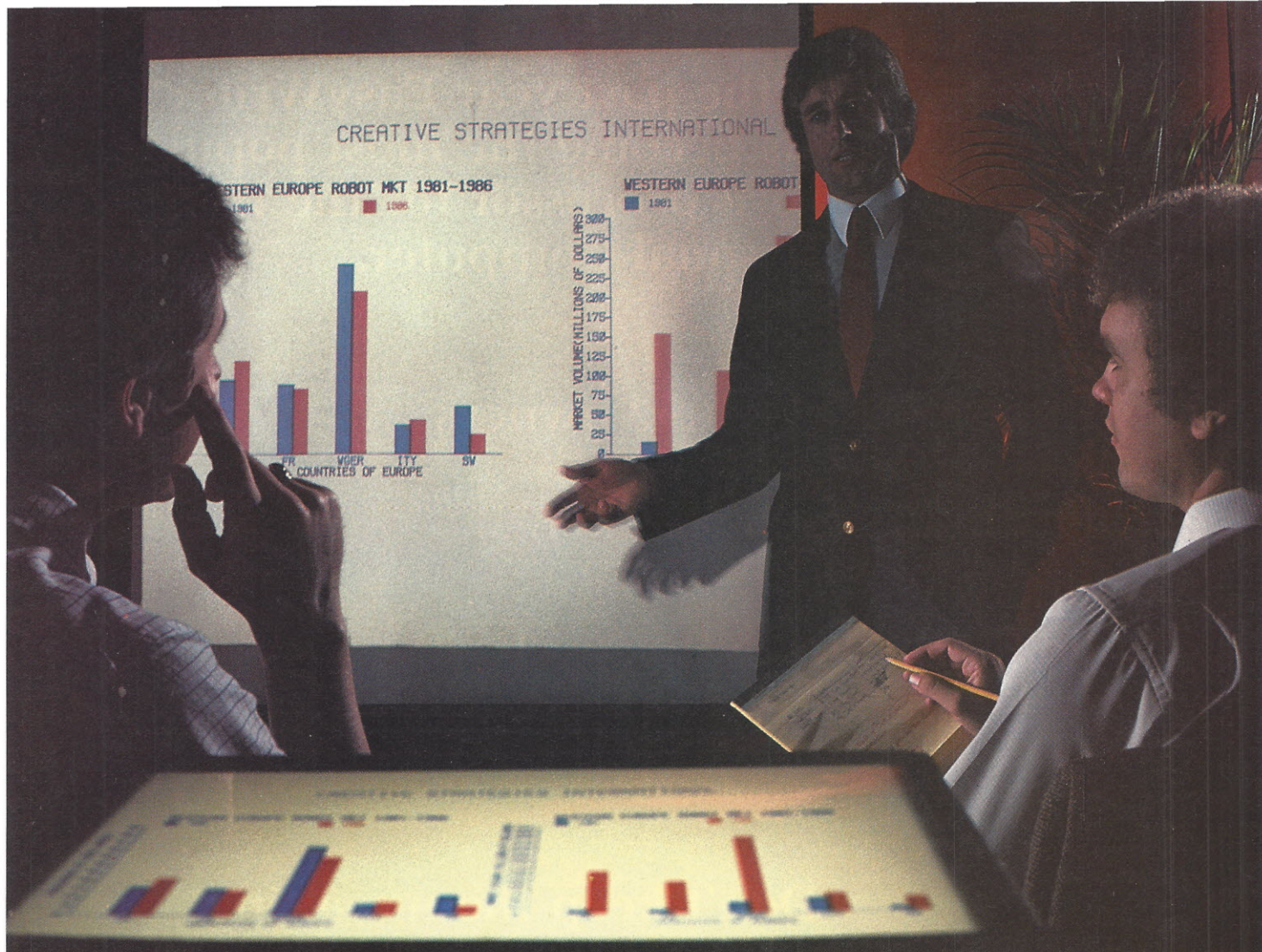
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It's a fact. The Strobe Graphics System contains everything you need to transform complex data into dynamic, colorful visuals: software, hardware, documentation, accessories. Transparencies that once took hours to produce are plotted within minutes. Information can be presented as bar charts, pie charts, flow charts or curves in a variety of colors. And all with a resolution and quality matched only by systems costing thousands of dollars more.

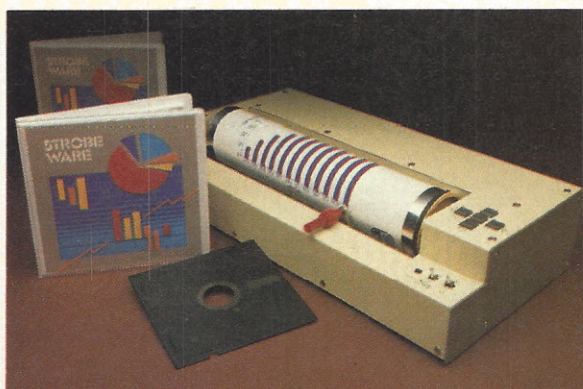
The new StrobeView composer package is the newest addition to Strobe's already

extensive library of easy to use, menu-driven software. StrobeView is a "scratch pad driven" program with a spatial memory feature for consistently positioning text and graphics in the same place on a page... use after use, edit after edit.

But that's just the beginning. With StrobeView, you can create a broad variety of linear flow charts, block diagrams and organizational charts. You can also choose among several preprogrammed symbols for emphasizing important figures. The system allows you to process and edit text, and will print boldface,

offset or regular type in a wide range of character sizes. And when you are finished with a transparency, you can alter, edit or save your text for future use.

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Consumers unite

In response to Carl H. Garrison's letter (JA Jul 82), I would like to say "Well Done," but you haven't gone far enough.

Consumers of this country are plagued by disreputable sellers. These sellers commit a variety of sins against their customers, the least of which is slow delivery. What is needed is a system to force the sellers to take responsibility for their products. In the area of direct retail sales to the ultimate user, when a seller does not support his products, the users can tell their friends and go elsewhere.

My suggestion is that there be some sort of a code of ethics or minimum standards of business conduct for mail order sellers of computer equipment. This code could be voluntarily administered by the sellers through their trade organizations, whereby those who are approved could display a notice of the approval in their advertising. An alternate method would be to simply provide a forum, preferably of wide circulation, such as a magazine, where consumers could air their grievances and consumers could read about other's difficulties with a particular mail order seller.

For the consumer, the only way to affect a sanction is to vote with one's pocketbook and take his business elsewhere.

Simply stated, my request is that you assist your readers in finding the disreputable merchants who do not deserve our business and, conversely, who are the reputable merchants who deserve our continuing business.

William Flynn,
Hopkins, MN

The specific name of the merchant involved in this incident was deleted at Mr. Garrison's request.

Our policy upon receiving a letter criticizing a company's service or products is to send a copy of that letter to the company. The company is given a reasonable amount of time to respond. Then a decision is made whether or not to publish the letter.

While we are not equipped to serve as a consumer agency, we do report news of reputable—or disreputable—business practices within the context of our review articles and various departments.

—ed.

OCTOBER 1982

Graphics for IBM

I have an IBM PC and a fully-configured Prism-132 printer. I continue to be fascinated by the myriad of ads I see in the computer magazines each month. However, most of the really fun programs (be they games, music synthesizers or graphics aids) seem to be aimed at owners of Apples or TRS-80s. Some of the problems (I am told) are due to the newness of the IBM, as well as its non-standard 8088 microprocessor and the lack of a standard operating system. This letter is to urge manufacturers to work on powerful, user-friendly software that is capable of utilizing the full capabilities of the IBM for music and color, rather than sticking to plain-vanilla business applications. I would like to see the IBM DOS (in either the DOS version 1.05 or the new DOS 2.00) become the standard operating system for the IBM. There is a real market for software that will allow IBM users to make full use of our system as well as all the nifty features of a fully configured Prism printer, without being forced to resort to awkward home-made utility programs written in Basic. Right now, I am using Easy Writer-II for word processing. It has a beautiful editor, but it cannot even begin to make full use of the advanced features on my Prism—either for color or for graphics (or even for justifying copy using either proportional spacing or mixing type sizes on a single line).

I suspect that lots of IBM owners are in a similar boat. We really do want all the games, graphics, and music abilities that Apple and Radio Shack owners enjoy. Please don't let us down.

Bill Siebert
Spencer, NY

UNIX—compatibility

An article by Alan R. Miller (JA Jul 82) describes a new program that offers "... UNIX Features for CP/M." Although the article was quite informative, I feel certain implications have done a disservice to your readers.

Mr. Miller states "UNIX-like systems are beginning to appear on the 16-bit machines, but UNIX is not available for 8-bit machines." Though the statement is technically correct, there are a

number of UNIX-like operating systems available for 8-bit machines. Our company offers UniFLEX, a multi-user, multi-tasking, UNIX-like operating system. We are a systems software house utilizing an 8-bit production machine operating under UniFLEX, which typically processes more than 2,000 tasks a day.

Our operating system was developed "from scratch" and is written in machine code. It is a UNIX-like system designed specifically for a microcomputer environment.

Don Sinkiewicz
Technical Systems Consultants
Chapel Hill, NC

Bug catching

Re: "Micro-Mathematician" (JA Jul 82), Dr. John C. Nash's program contains a bug somewhere. Statement 630 has a Go Sub 1100. There is no 1100 address. Either this is a wrong address or the subroutines at 1100 was omitted from the listing. Can you help?

W. R. Kennedy
Birmingham, AL

The subroutine at line 1100 was published in the June 1982 issue. The separation of the text and program in my July article may have contributed to the confusion about the "missing" subroutine.

—JCN

Users' groups

Berkshire County, Massachusetts now has a support group for owners of Atari 400 and 800 computers. We are interested in exchanging newsletters and information with other users' groups.

J. J. Brown
Berkshire Users' Group (Atari)
Great Barrington, MA

In reply to Clarence Heir ("Letters" JA May 82), we are attempting to start a users' group for the Netronics Explorer 85. For further information, contact me.

Fred Quebec
566 Zillmer St.,
Prince George, B.C., Canada

INTERFACE AGE 17

Oct 1-2 San Jose, CA, *Conference on Classroom Applications of Computers* includes workshops, field trips, speakers and commercial exhibits. Computer-Using Educators, Box 18547, San Jose, CA 95158.

Oct 5-7 Phoenix, AZ, *Southwest Semiconductor Exposition* will feature manufacturing suppliers of equipment and materials dedicated to semiconductor, PCB and hybrid industries. Carlidge & Assoc., 491 Macara Ave., Suite 1014, Sunnyvale, CA 94086.

Oct 5-7 Anaheim, CA, *Western Design Engineering Show* will spotlight computer-aided design (CAD) and computer-aided manufacturing (CAM). Clapp & Poliak, 708 Third Ave., New York, NY 10017.

Oct 11-14 New York, NY, *Information Management Exposition & Conference* concentrates on management aspects of information, and will devote intensified attention to software. Clapp & Poliak, 708 Third Ave., New York, NY 10017.

Oct 12 Newton, MA, *Single source computer show* is for OEMs, sophisticated end users, dealers and distributors. Norm De Nardi Enterprises, 289 S. San Antonio Rd., Suite 204, Los Altos, CA 94022.

Oct 17-20 Chicago, IL, *Data processing management conference and exposition* focuses on operational management. Data Processing Management Assoc., 505 Busse Highway, Park Ridge, IL 60068.

Oct 17-20 Boston, MA, *Paper handling seminar* will discuss the development, evaluation and planning of printer systems. Datek, Box 68, Newtonville, MA 02160.

Oct 20-23 Singapore, *Personal Computer Show* will feature displays on every aspect of small computers. Overseas Exhibition Services Ltd., 11 Manchester Square, Condon W1M5AB, United Kingdom.

Oct 21-24 Los Angeles, CA, *National Computer Conference and Expo for Educators* will offer seminars, workshops, demonstrations and exhibits. Judco Computer Expos, Box 963, Scottsdale, AZ 85252.

Oct 26-28 Reno, NV, *CAD/CAM Conference* will focus on advances in computer-aided design and manufacturing technology, including such areas as interfacing, facilities planning, numerical control and architectural engineering. CAM-I Conferences, 611 Ryan Plaza Dr., Suite 1107, Arlington, TX 76011.

Oct 28-31 Washington, D.C., *Computer and office equipment show*. Computer Expositions, Inc., P.O. Box 3315, Annapolis, MD 21403.

Oct 29-30 Visalia, CA, *County Computer Faire* will provide an assortment of exhibits and seminars encompassing home, school and business microcomputer applications. College of the Sequoias, 915 S. Mooney Blvd., Visalia, CA 93277.

Oct 31-Nov 3 Barcelona, Spain, *Payment System Symposium* will feature discussion of bank automation

developments, cash dispensing, home terminals, electronic payments clearing and communications networks, as well as product and service displays. William H. Moore, 100 Peachtree St., Atlanta, GA 30303.

Nov 1-3 Atlanta, GA, *Database conference* will evolve around applications for micros in information centers. Online, Inc., 11 Tannery Ln., Weston, CT 06883.

Nov 7-9 Albany, NY, *Educational Data Systems Conference* intends to address administrative uses, curricular issues, hardware and programming aspects of instructional computing. Gary Bruce, 55 School St., Delevan, NY 14042.

Nov 8-12 Blacksburg, VA, *Personal microcomputer interfacing workshop* also includes a discussion of scientific instrumentation automation. Virginia Tech, Blacksburg, VA 24061.

Nov 9-11 Chicago, IL, *Technical information exchange workshop* is open to participants and nonparticipants in the Government-industry Exchange Program. Focus will be on engineering, failure experience, reliability/maintainability and metrology. GIDEP Operations Center, Corona, CA 91720.

Nov 9-11 San Jose, CA, *Electronics exposition* will feature displays of production equipment, tools, hardware supplies and test instruments. Cahners Exposition Group, 222 W. Adams St., Chicago, IL 60606.

Nov 9-10 Saginaw, MI, *Computer Expo* is a regional show displaying products and services in the Great Lakes area. Data Processing Management Assoc., University Center, MI 48710.

Nov 9-13 Munich, West Germany, *Electronic component and subassembly trade fair* will feature semiconductors, passive, electro-mechanical components, connecting elements and sub-assemblies, as well as technical congresses on micro and macroelectronics. Kallman Associates, 5 Maple Court, Ridgewood, NJ 07450.

Nov 15-17 Blacksburg, VA, *Microcomputer interfacing workshop* will involve hands-on design and programming using the Z80/8085/8080. Virginia Tech, Blacksburg, VA 24061.

Nov 9-14 West Palm Beach, FL, *Microcomputer conference and exhibition* will feature the latest innovations with an emphasis on applications. The Science Museum, 4801 Dreher Trail North, West Palm Beach, FL 33405.

Nov 10-12 Reno, NV, *Accounting and information systems exposition* is intended to expand on recent legal, technological and methodological advances in automated accounting. University of Nevada, Reno, NV.

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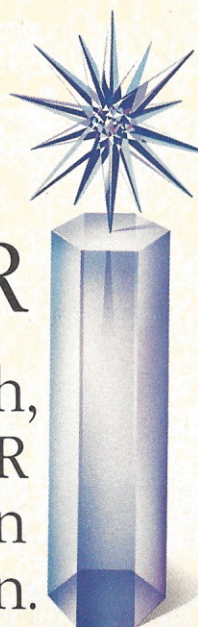
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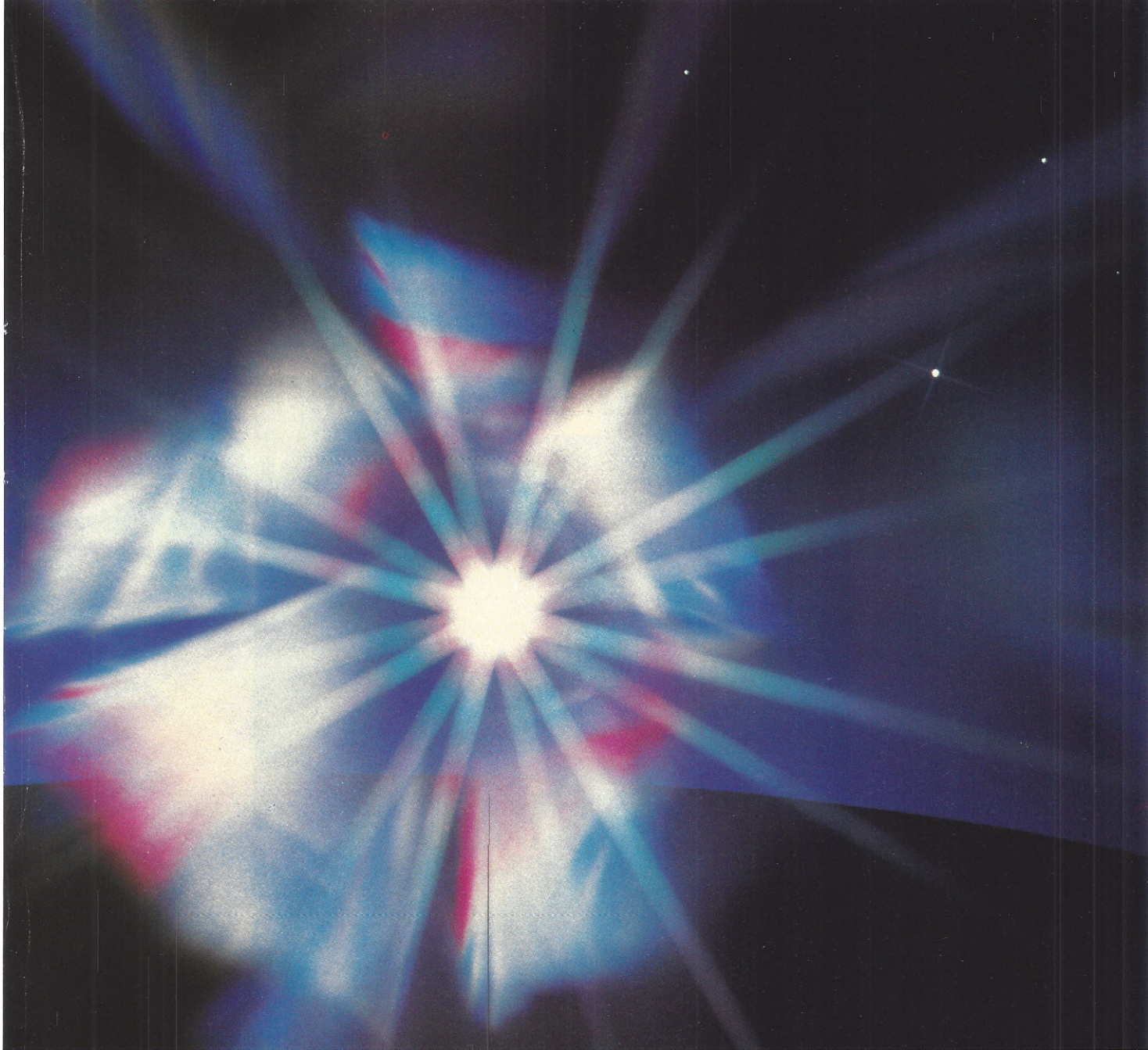
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ATARI is looking for some of the greatest software from the brightest stars in the software field. And naturally, we're willing to reward you for it.

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Quarterly prizes will be from \$750 to \$3,000 worth* of selected



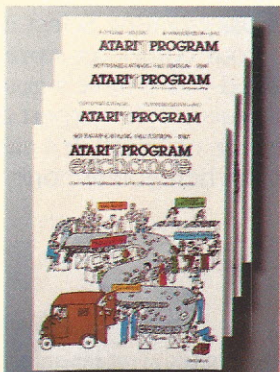
ATARI products and an ATARI STAR. The annual Grand Prize will be the coveted Super Star trophy and \$25,000 in cash.**

To be eligible, your software idea must be submitted to and published in the ATARI Program Exchange catalog. Submit your program on the official entry form which we'll rush to you if you send in the attached coupon.

The ATARI STAR Awards are in addition to the percentage of revenues you will automatically be entitled to as

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**Taxes are the sole responsibility of the winner. Void where prohibited by law. Winners will be notified by mail. ATARI employees and their families are not eligible. For more contest details, call the toll-free numbers. © 1981 ATARI, INC.

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Yes, I want to enter the ATARI ASAP competition. Please rush me my entry form.

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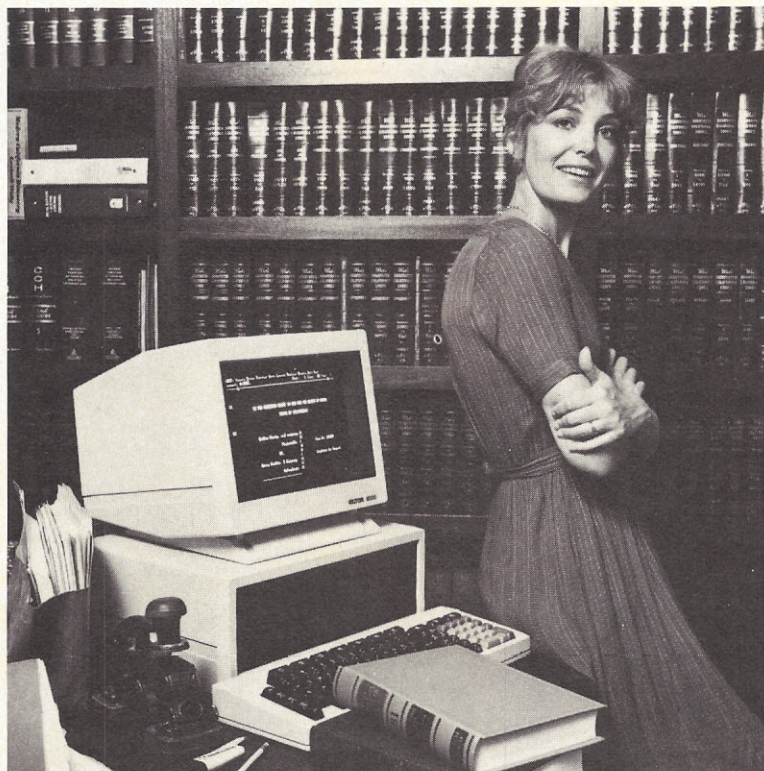


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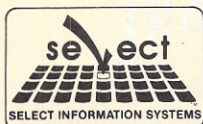
(Geri McCauley, Legal Research)



Geri McCauley's done time. She's processed scores of legal briefs, pleadings and motions and disciplined some pretty disheveled files. But today she pores over legal code, gleaning crucial information and has others process research for her. Geri needed a word processor that didn't make big training demands on her, or her staff. She tried some systems that required special instruction (highly impractical for a busy law firm) and others that crushed enthusiasts with difficult manuals. She chose Select™—the only word processor with an exclusive video tutorial that teaches any user right at the computer terminal. And Select does it in 90 minutes, or less.

Sit down in front of a Select and begin by typing "T" for Teach.™ Don't take your eyes off that screen—you won't need an instruction manual. Command Superspell, the multi-thousand word dictionary to catch and correct all your spelling errors. Call up Select's merge print feature to personalize form letters or to construct huge mailing lists. All these features are built-in. No shopping for additional software.

Cross examine Select just by walking into your computer store. When you've finished you'll have a good idea about what distinguishes this expert document manager from the ordinary. It's easy to spot a professional when you are one. Just ask McCauley.



SELECT...The Word Processing People™

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A Comprehensive Reference Source

Datapro Reports on Word Processing by Datapro Research (Delran, NJ) consists of two hefty looseleaf page notebooks—each 2½-in. thick—filled with everything you need to know about word processing and may not have had enough information to ask.

For managers, office planners, consultants and anyone responsible for the installation of word processing equipment, the information is invaluable and more thorough than anything I've seen elsewhere. This exhaustive research by an independent service makes it an unbiased resource for potential users of systems, products and services. I suspect it is the basis for much that is written in other magazines and newsletters. The volumes reviewed concentrate on dedicated word processors, but the information and method of ratings are applicable to microcomputers.

The report is replete with tables and charts that provide instant insight into features, parameters, and pricing of over 140 standalone word processing systems marketed by vendors from Adler to Xerox. Here, in an easy-to-read compilation, are the configurations, features of the display units, printers, text input characteristics and other factors. The final section in the analysis has a word processor user rating.

Want to know how to use word processors effectively for specific applications? How could one be applied to law offices, banks, insurance companies, medicine in hospitals and individual health care practices? How do you perform feasibility and planning studies? How do you work with consultants? The answers are here—along with company names, personnel and locations for every service. There's a glossary of word processing terms and standards, too.

Volume two is devoted to the auxiliary applications of word processing that Datapro refers to as "the integrated office system." That's an office in which all elements and procedures are linked into a unified system for conducting company operations. These include data processing, word processing, image processing, voice processing, communications and all the computer technologies in relation to the human element and the office.

The underlying purpose of the report is to present guidelines for managers and supervisors to consider before purchasing equipment, so that every procedure is logically planned. It fulfills its purpose admirably. The editors caution "The consequences of a poorly-planned system will be felt for many years."

Each discussion thoroughly covers one aspect of an office. It will help managers initiate and continue to use word processing to full advantage. The sections are written in easy-to-read, non-technical language that does not pre-suppose in-depth knowledge. If you are first investigating electronic mail or timesharing, you'll be able to absorb what it is all about, how it may apply to you, and sources for contact. Subsequent chapters deal with supplies, evaluations, prices and a supplier listing.

A complete chart of software used for the various systems is given. You can see how programs compare and differ in functions: the hardware with which it is compatible, language, price, installation and maintenance fees, documentation, type and availability of training

and number of users reported (not always available) for each software package. Some companies report as few as six users, (Word Processing System, Scott McEntree & Assoc., Encinitas, CA) to nearly 30,000 (WordStar, MicroPro Int'l, San Rafael, CA.)

A company considering "handshaking" its word processing operation with photocomposition will find methods and units recommended. Central dictation equipment is also offered with a list of vendors. Features of various units and sizes are analyzed and compared. A second section deals with desktop and portable diction units.

What do you want to know about impact printers? Their history? How they work? How they rate? Datapro has their characteristics charted independently of those listed in the standalone systems. If you ever wondered where to find all the vendors and what each sells, they too are charted and listed.

There's more. Datapro subscribers receive monthly newsletters and report supplements that update the information in the initial volumes. There are reports on new systems and models, user analyses, news of added services by individual companies, and announcements of upcoming meetings, conferences on word processing and related office management subjects.

What do you want to know about impact printers? Their history? How they work?

If all that were not enough, there is one additional and seductive feature. Datapro maintains a direct inquiry service that allows the user to correspond or speak with its staff of editor-analysts, consultants or research assistants. The staff is backed up with a database of thousands of product manuals, specification sheets, etc. It has direct contact with most vendor marketing, sales and engineering personnel.

When you write your request on the inquiry form provided, or telephone or Telex it in, the research staff will address your question and return your answer by letter or phone. There is one caution: should a request require significant original research, extra costs may be incurred, but you would be advised and given a choice as to whether or not you wish to OK the search.

I tested this service. I requested by mail results of Datapro's reviews of three heavily advertised word processing systems for microcomputers that have been on the market for at least six months. My telephone answer came three weeks later from a young woman who apologized that "the programs were too new for our staff to



have any results." Usually, she explained, user tests require about a year for feedback. It would take their staff at least three to four months to test, and another couple of months to have them in the service. She did tell me about another new magazine Datapro is publishing in the near future that should shorten this time lag.

I made another test. I wrote to fifteen companies listed who offer timeshare services. I asked for their general procedures and fees. I requested answers in two weeks. I received one answer by telephone from Wang Laboratories. Five letters were returned with "Undeliverable no forwarding address" post office notices. I mentioned this to the young lady who answered my inquiry and was told that Datapro is primarily "a products information service." Timesharing is not a product, it's a service,

Datapro maintains a direct inquiry service that allows correspondence with research assistants.

she reiterated—trying to get the difference through to me despite the listing. She could give me no help on that score. Whatever the score is, I'm still not sure.

What does this comprehensive on-going subscription cost? Datapro charges \$425 per year for the complete service. For \$85 per year, non-subscribers can receive the four-page newsletter, which, does not seem to contain enough information to warrant the expenditure. A couple of magazine subscriptions for the same money would net more information.

Should you wish to preview the volume and service, Datapro, a McGraw Hill Company, has a 30-day trial offer for \$20, good only in the 48 contiguous United States. It is free to non-profit institutions. A similar trial offer applies to the full line of Datapro reports.

As a planning guide for office administrators, managers, supervisors and consultants, the Datapro word processing kit appears to be an ultimate reference.

Word processing bookshelf

Word Processing and Office Automation: A Supervisory Perspective by Gilbert J. Konkel and Phyllis J. Peck (Office Publications, Stanford, CT) is also aimed at managers who are contemplating installation of word processing equipment. The authors establish the premise of the book as a life preserver for those who are crying "Hel-l-l-l!" They offer that help based on their own experiences with management theory, concept and practice. There is good solid information throughout—covering the problems that come up in an office, with viable approaches

to various solutions. They give concrete examples as to the necessity of and ways to define jobs, preparing yourself for a management position, discussing roles with management, designing the system and choosing the right equipment.

You'll learn how much and what to expect from the employees you supervise as to workloads, output and information flow. There are examples of document production that show how information is ideally moved through the office. It covers possible and related interpersonal problems among supervisors and other personnel.

Charts list the features that word processors, software and peripheral equipment should have. Price lists will aid in comparing the costs of leasing versus buying. Evaluation questions help pinpoint what to look for and the types of questions to ask when buying a system. Examples of forms to integrate the word processing equipment into the office efficiently could save hours of trial and error.

The only problem with the book is its style. Instead of straight narrative, there are four characters talking to one another: each making his/her points. It's as though the conversations were tape recorded, typed and printed—and not edited. The reader is bogged down in meaningless trivia throughout such as: "Well—Oh! you mean microfilm." and "Oh. I see."

If you like this kind of writing, and can visualize the characters as ones in your own office, you'll be able to work your way through the book. If your time is at a premium, you'll probably become impatient with the writing after the first few pages. But the book has useful information for managers and supervisors who may desperately need exactly the wealth of suggestions offered. The book contains 165 pages and retails for \$12.95.

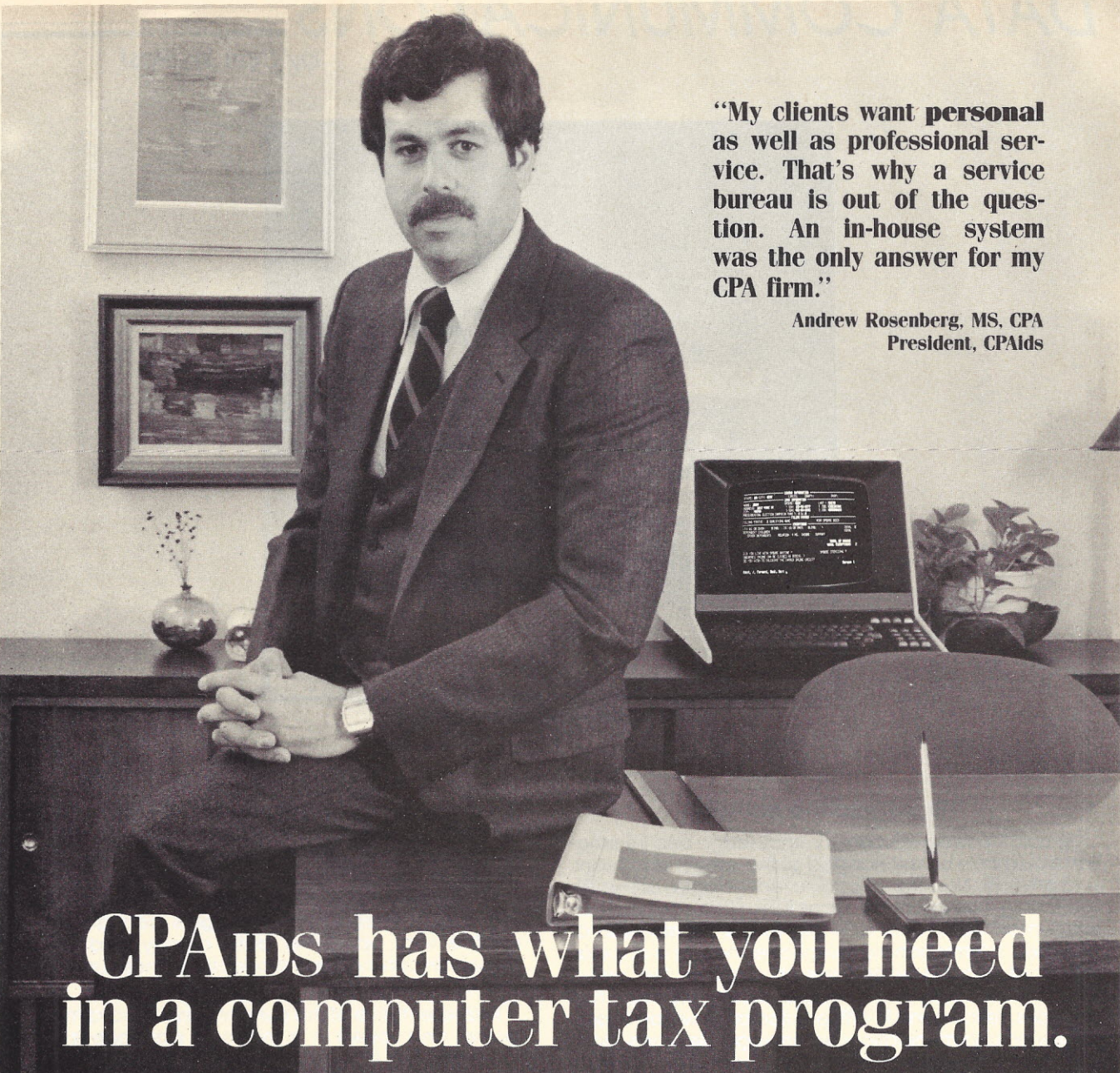
A useful WordStar reference is *Introduction to WordStar* by Arthur Naiman (Svbex, Berkeley, CA).

This book is well-organized and written in a friendly manner. It nearly supplants the manufacturer's manual. There are thorough directives for using MailMerge and Spellstar in addition to WordStar. The appendices explain variations of the program when used on different machines, summaries of other MicroPro programs that are integrated with WordStar, summaries of commands of the three programs covered, a clever visual map of WordStar and a command and symbol index. It is recommended that this work be digested before purchasing the program.

In paperback, the book includes 202 pages and retails for \$8.95. □

Contributing editor Dona Z. Meilach is the author of over 65 books and hundreds of magazine articles on a variety of subjects. She is hooked on computers for the creative process. She is currently writing a novel, a book about computers, and is conducting author workshops and tutorials on word processing and spelling systems.

One unique application that she employs is a comprehensive file of all of her manuscripts and accompanying photos. She works regularly with a Zibex Z80 8-in. dual density system, a Zenith H89 terminal and the WordStar word processing program.



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*PERSONAL COMPUTING
(December '81)*

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*INTERFACE AGE magazine
(April '82)*

Five years ago, with my tax practice steadily growing, I considered using a service bureau to process my clients' returns. The efficiency and accuracy that only a

computer can give held tremendous appeal.

However, I knew that my clients chose to come to me because of the personal touch my practice afforded them. I really had no desire to act as the "middle man" between my clients and a service bureau. The thought of sending my clients' confidential records outside my office was not really my idea of what a CPA firm was all about.

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INTERFACE AGE 25



Lex-31 communications device

The Information Explosion

Up until the twentieth century, knowledge and information could only be exchanged at the speed of humans and animals. Now the electronic technologies are really fine-tuning the communications flow. *Data communications*—most commonly referring to the transmission of encoded information via telephone lines—is a popular buzzword among executives throughout the world today. And rightly so, because during the next two decades, refinements in office automation will be based largely on communications technology. Networks facilitate more timely interchange of data and considerably faster information flow; computer power is optimized and becomes more accessible to the user.

Interestingly, both the data processing and telecommunications industries are capable of supplying data transmission, communications processing and media conversion. Current modes of usage such as source data entry and collection, remote job entry, information retrieval, timesharing and message switching will inevitably be joined by new forms of interprocessor data exchange. There will be unprecedented competition and innovation. This column represents the first in a continuing series that will be concerned with illuminating alternatives available in the data communications field—in hardware, software, transmission facilities and descriptive literature.

Among the latest products supporting the communications blitz, portable terminals provide remote access to a variety of information, including airline schedules and weather reports for the traveler, encyclopedia and periodical articles for the researcher and stock market quotations for the investor. Perhaps most significantly, they can be used to verify inventories, perform credit checks, place new orders and establish shipping dates during sales calls.

26 INTERFACE AGE

Another valuable application of these hand-held terminals is electronic mail. Although restricted to a certain extent by the limited display size and number of characters storable, business executives can transmit messages to any office from virtually any of the world's 500 million telephones. Managers can access and update vital operating data quickly and traveling personnel can increase productivity. These units can be cost-effective paging units as well.

Representative of the current trend toward maximum power and speed in a minimum package is Lexicon Corporation's (Ft. Lauderdale, FL) new Lex-31. It weighs two-pounds, measures 10.5-in. by 5-in. by 1.75-in., has a 73-key color coded keyboard and a 40-character 5-by-10 dot matrix LCD readout display area. A 16-message panel provides the user with operational information like: *on-line*, *memory active*, *line ready*, *send* and *save*. A 300 baud asynchronous Bell 103A modem is built-in. The unit is battery powered (rechargeable) or can be operated off an AC adapter.

The 16K-byte on-board memory is capable of being segmented and labeled into 20 categories for holding multiple messages or other information. It can be programmed to retrieve pre-selected information with a single keystroke. This feature encourages savings in fee-based services, because the user doesn't get charged for time on the host computer until a query has actually been fed into the terminal. Programmed as a standard feature is a special direct key—authorized by Dow Jones News/Retrieval Service—to access its database without tedious multi-step sign-on procedures.

The Lex-31 has a personally-programmed password access to data storage as a security feature, incorporates a memory calculator, perpetual calendar, alarm clock and limited word processing capability. It retails for \$995. □

OCTOBER 1982

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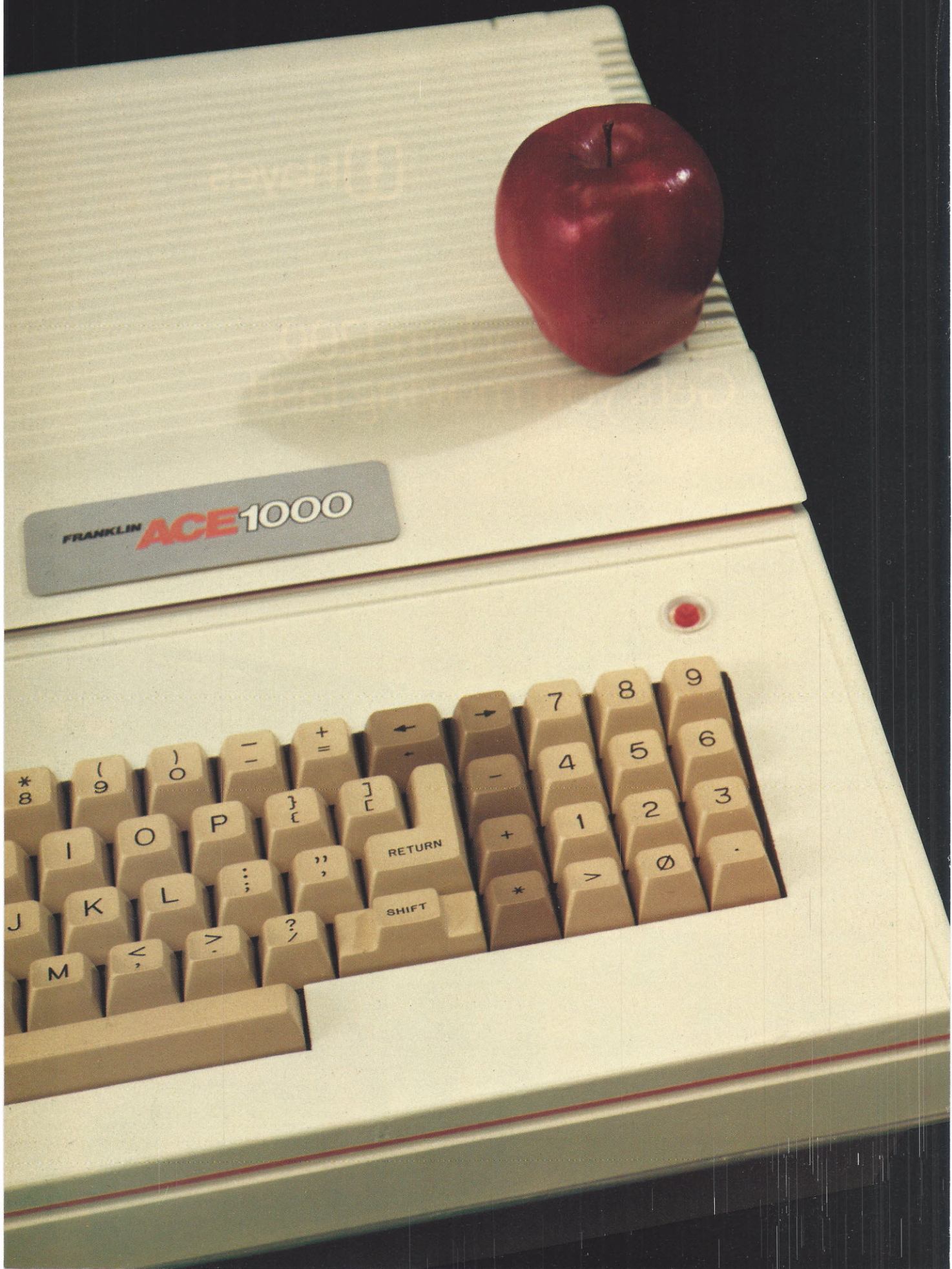
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CIRCLE 7 ON INQUIRY CARD



Apple's Speed Reader

Apple's Speed Reader, a self-instructional program that increases reading speed and comprehension is the first in a series of collaboratively designed software programs. It was two years in the making before it was packaged for sale. "That's why it's such an effective program," explains Dr. Janice Davidson, founder and director of Upward Bound, a non-profit educational association in Palos Verdes, CA. "We tested and rewrote the program countless times before it ever went out the door."

Three years ago, Janice Davidson, Ph.D., joined forces with Richard Eckert, an electrical engineer who has written a variety of computer software programs. At that time, California's Proposition 13 legislation was leaving its mark on the Palos Verdes School District in the form of widespread district cutbacks. One of the first programs to go was the one that assisted high school students to prepare for their college entrance exams. Davidson, a consultant to the school district, saw a need to offer a program the schools couldn't. That was when she bought her first Apple computer and joined forces with Eckert to design a self-paced speed reading program. Davidson claims that most students lacked the critical reading skills to get through the high-pressure, timed SAT test—an exam that has become the national yardstick of college admissions officers who decide who to enroll—or not to enroll—in their institutions.

Though originally intended for high school students, Speed Reader is an entertaining, self-paced program now available to anyone who wants to increase their reading speed. "For a long time, I thought the program was great for Upward Bound, but not for the mass market. Richard convinced me otherwise, and now that I see how it's doing, I'm happy he did," reflects Davidson over their decision to let Apple distribute the program. The combination of Davidson (educator) and Eckert (computer programmer) makes for a well-rounded design team. "We argue all the time," says Davidson about her working relationship with Eckert. "We have completely different personalities and come from totally different points of view."

Eye span is improved

Readers who take on the 10-session Speed Reader course learn to move their eyes more efficiently across the printed page. "Eye movements...how you move your eyes across a page...determine your reading speed," contends Davidson. Eye span (the number of words you read at each pause) and perception (the duration of each pause) are the two primary ingredients that make up reading speed. Speed Reader works at getting the reader's eyes to pause less often for less time over printed words.

The program runs on a 48K Apple II with an Applesoft or language card, or on a 48K Apple II Plus system. One disk drive with a disk controller containing 16-sector PROMs and a video monitor is also necessary. The user has a choice of running the program with or without sound effects.

Speed Reader begins with a timed test to measure the reading rate and comprehension level of the user. From here—over a period of weeks—the student moves through 10 sessions of self-paced exercises where each

session builds upon the skills developed in earlier exercises. In just 30 minutes, the student can complete the five components that make up each session.

Warm-up Exercises with letters kick off the beginning of each session. There are three levels of difficulty where either two, three or four letters are flashed up on the screen at a time. Whenever the participant enters a right answer, the speed increases slightly. This drill develops peripheral vision, which assists the reader to read large groups of words at a single glance. Warm-up with words comes next, which follows the same format as the previous exercise.

Eye Movement Lesson is the third exercise. A group of words flash on one side of the display and then on the other to continue back and forth down the screen. The challenge is to read the words, then remember what has been read. The lesson helps the student to dispose of lazy eye movements that make reading a time-consuming chore. Using peripheral vision, the reader slaloms through the article at a much faster pace than is possible if reading only one or two words at a time. A multiple-choice quiz tests comprehension at the end of the exercise.

Column Reading Lesson is yet another obstacle course for the eyes, which provides additional practice in using peripheral vision. A column of words is displayed down the center of the screen. The user must read each line with only one eye fixation, or pause, then move down to the next line. A multiple choice quiz checks both reading speed and comprehension.

Reading Passage Lesson is the encore exercise where the student chooses one passage from 14 possibilities and selects a reading speed anywhere from 100 to 2,000 words per minute. A column width from 1-12 must also be specified with the widest column being the most difficult. Following each passage is an eight-item comprehension quiz where an elapsed time indicator measures the number of seconds it takes the participant to answer the quiz questions.

"For once we have the missing link between reading theory and practice" remarks Mary Clark, a veteran Reading Resource teacher with Palos Verdes Schools. Clark has been piloting the Speed Reader program with eighth graders for the past few years and has seen some phenomenal success stories. "These kids were unmotivated and reading below grade level and now they're excited and confident about their reading because of the success they've had." Students who go through Clark's course, which uses the Speed Reader program, have been doubling or tripling their reading rates. Some students have even consistently scored 1,000 words per minute.

Most adults who complete Speed Reader think the course is a worthy investment of their time. A double or triple reading rate means they now have a fighting chance of devouring the evening newspaper as well as the haunting stack of books on the headboard.

Jane Willson holds an M.S. in Instructional Technology. She spent seven years in West Coast classrooms teaching on levels from elementary to university. Currently she is editor of Apple On Apples, the company's news magazine for users.

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IA



Prolific Portables

Skeptics winced when Adam Osborne created his own niche in the market with the unique transportable micro that would fit under the seat of an airplane. That gap has since transformed from crevice to canyon. A plethora of similar-housed components have recently been released—all of which attempt to outperform the original offering. Conspicuous among the machines in this increasingly popular category are the Kaypro II and Extec 1000.

Kaypro II? The Roman numeral might lead one to believe that the first generation slipped through the marketplace unnoticed, but a quick review of the machine's heritage and market position hints that such a feat would have been unlikely.

Non-Linear Systems' (Solano Beach, CA) Kaycomp I was only a prototype—named and leaked to the press, but never marketed. The Kaycomp II changed to its present name during initial promotion. The metal-cased unit has stepped into the ring face-to-face with the popular plastic-housed, similarly sized and equipped Osborne I from Osborne Computer Corporation (Hayward, CA).

It matches the competitive opponent Z80 for Z80, byte for byte, CP/M for CP/M—the dollar signs on the price tags are even followed by the same numbers. In an effort to offset Osborne's established marketing clout, the Kaypro designers worked in a larger monitor and offer double-density disk systems as standard; as a result, the machine is slightly heavier.

Even the software muscle is equally toned. Non-Linear is pitting Select's user-friendly word processor against MicroPro's well-established WordStar and Chang Laboratories' Profit Plan goes up against Sorcim's SuperCalc.

The Extec 1000, manufactured by Compak Electronics (Indianapolis, IN) takes the portable concept a step further—it includes a full-size printer and a case covered in luggage-type vinyl with brass hardware, as well as a 9-in. diagonal screen similar to the Kaypro's. The 9-by-9 matrix impact printer has 12 user-controllable combinations of type sizes and densities and features bi-directional printing at 80 cps. The printer makes the unit almost twice as heavy as the Osborne or Kaypro and the disk drives are not as accommodating as the latter's. It incorporates a spreadsheet program, but offers no word processing capabilities in the basic purchase price.

Although the Osborne, Kaypro and Extec are all similar in appearance, each wields its own unique set of attributes and compromises. Osborne still offers the most software for the money, Non-Linear the most media storage and Extec has the built-in printer. All come with 64K bytes of working memory and Basic.

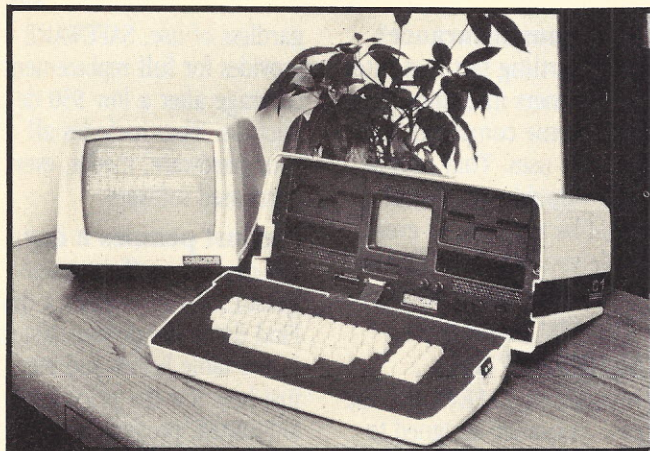
As forerunners in what is heralded as an explosive marketing direction, these portables will not be immune to serious competition from compact 16-bit machines sporting more streamlined housing designs. —DWP

Time Accounting

Accounting for time is often considered more important than accounting for dollars. It can be the key to profit. The accompanying program for handheld computers will help unlock such potential.

Although many approaches are in common use, the one used here is modeled from a system that came to us from Walt Nolan of Pittsburgh, PA. He has developed a comprehensive set of programs for his Pocket Computer

34 INTERFACE AGE



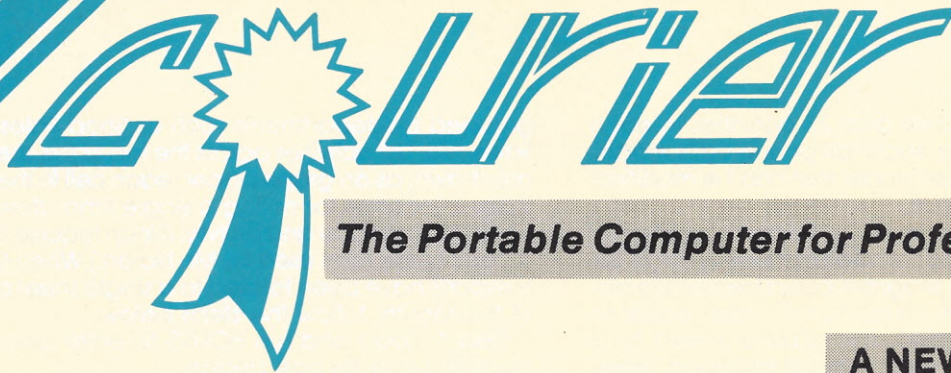
The Osborne 1



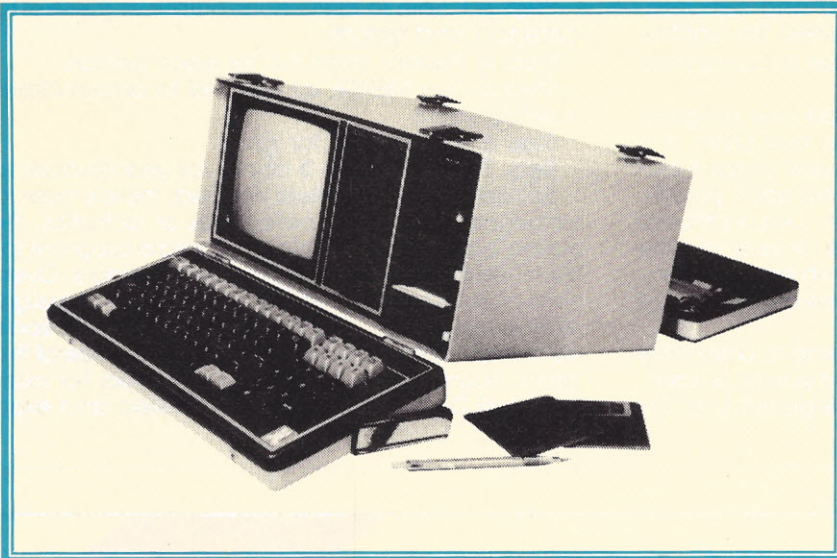
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that handles 27 categories and 23 activities in each category. In addition, he tracks all phone calls made. Presented here is a simpler model that can be modified to suit your personal needs.

There are three programs: Hours, Report and Merge. Hours is run to enter the accumulated monthly totals for one person. (A separate program could be used to accumulate total hours, but in practice it's often easier to do with pencil and paper). The data is saved to a scratch tape and the program chains to Report. Here, hours are reported by activity per category. When data for the last person has been entered and reported, Merge is used to accumulate as needed for monthly totals of all data. This final total can be accumulated to year-to-date totals.

One arrangement of tapes is to load one program tape with Hours, Report and Merge, in that order. If a counter is available, it helps to note the start of each program. A scratch tape will be needed for each person, except the last, for use during the session. One additional tape should be permanently available for year-to-date totals. (Note that when using a PC-1500 with extra memory, all these programs can be loaded as one and it may not be necessary to use scratch tapes.)

To report hours, you'll need to develop a daily time sheet. List categories down the left-hand side (e.g. Sales, Advertising, Support, etc.) These categories can be

grouped by departments such as Shop Sales, Outside Sales, etc. List activities across the top of the sheet. If lines are drawn, as on graph paper, each cell in the grid provides a location for noting a single time, devoted to a particular category and activity. (Upon request, I'll forward a copy of the form used by Mr. Nolan.) When these daily reports have been totaled to a single sheet at the end of the month, follow the steps below.

Step 1: Load and run HOURS to enter accumulated monthly hours for one person.

Step 2: Save totals to a scratch tape.

Step 3: Chain to REPORT for output of these totals by category and activity.

Step 4: Repeat steps 1-3 for each person.

Step 5: Run MERGE as needed to accumulate total monthly hours.

Step 6: Run REPORT for totals.

Step 7: Repeat step 5 and 6 for year-to-date totals.

Space for data is limited. As listed, there's room for approximately 27 items, categories or activities. If more space is required, consider a separate program to read item names from tape, after loading Hours. Over one-third of data space is saved by eliminating assignment statements beginning in line 20. There will be space for 40 or more items. The limiting factor is the size of the program, Hours. Further space can be saved. For example, the SAVE DATA routine can be deleted and executed

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manually. Prompts can be shortened. Although unwise, item names can be omitted altogether. They need to be used only in Report, but without item names, there'll be no verification of category/activity entry. (Another space-saver is to hold data as XXX.YYY where XXX is item J and YYY is item J+1.)

In setting up a system such as this, one must assume that changes will be made. It's important that it be as easy as possible to modify the program to accommodate modifications. Therefore, three important variables are used in each program: M = # of program variables, K = # of categories and L = # of activities. Reference throughput to subscripted variables is made in terms of these three values. Thus any of these values can be changed by changing only one value in each program.

Since space is limited, some things must be handled specifically. For example, section headings in categories and activities are specifically printed in the report according to IF statements. Further, when a category is added or deleted, it is necessary to specifically exclude use of the associated code.

—BM

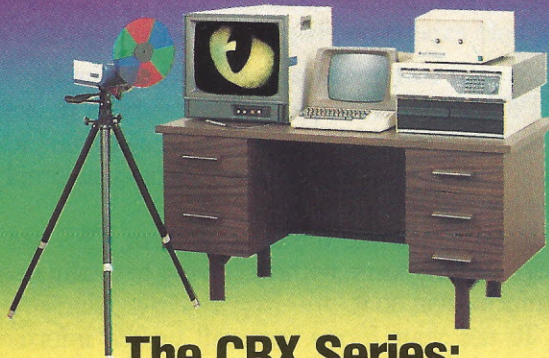
Contributing editor Bob McElwain is a graduate of Pepperdine College with an MA in Mathematics from Boston College. He works with Los Angeles City Schools as a computer science instructor, and as a software consultant for business and industry. He's the owner of Hanco Software (Sylmar, CA), specialists in software for handheld computers.

Variables used

A=Category code entered.
B=Activity code entered.
C=Number of hours entered.
D=Count of number of entry.
E=Accumulated total hours.
F=Temporary value.
G=Temporary value.
H=Temporary value.
IS=Temporary value.
J=Loop parameter.
K=Number of activities.
L=Number of categories.
M=Number of program variables.
A(1)–A(M)=Program variables, as listed above.
A(M+1)–A(M+K+L)=Titles of categories and activities.
A(M+K+L+1)–A(M+2K+2L)=Accumulated hours per category and activity.
Beyond A(M+2K+2L)=Used in MERGE to accumulate totals.

Continued on page 143

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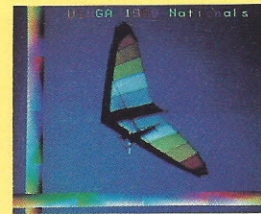
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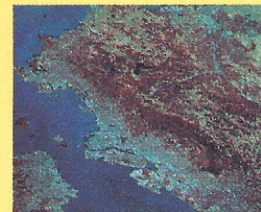
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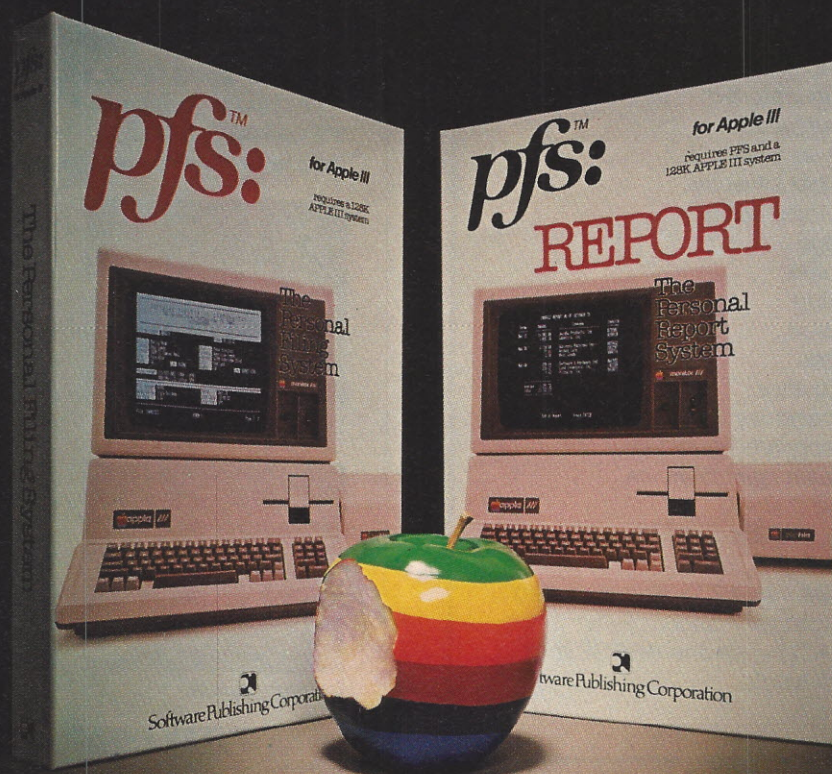
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CIRCLE 74 ON INQUIRY CARD

Assignment: Benchmark

Commodore CBM 8032

by Hillel Segal

The top-line business computer from Commodore (Wayne, PA), the CBM 8032, is the least-expensive complete system we've tested yet. Despite low cost, the system did well in our accounts receivable benchmark test.

Commodore computers were first offered in 1977. The original PET 2001 was intended primarily as a hobbyist system. Since then, other models have been introduced with features more suited to business use—the culmination of which is the new 8032.

Commodore-supplied software includes two database management packages, word processing, legal time accounting, and other business applications, with much still under development. Outside vendors provide a number of programs listed in a *Software Encyclopedia* published by Commodore.

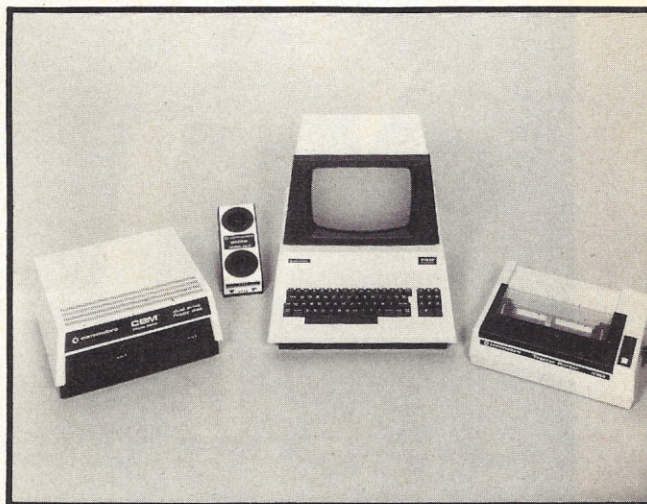
Commodore's word processing program, Wordcraft-80, appeared satisfactory. Several users had a different package called WordPro 4-Plus, offered by Professional Software. Dealers typically offered software packages both from Commodore and other suppliers.

The CBM 8032 was tested in the Association of Computer Users' continuing series of small computer benchmark studies. The tests are conducted under contract by the University of Colorado's Business Research Division.

Results obtained from the CBM 8032 were generally about par for its class of system—a low-priced machine emphasizing Basic language and graphics. For the accounts receivable test, the Commodore's time was a lively 3 minutes, 36 seconds. Here it ran in the top half of the group. The disk access function plays a large role in this and many real-life accounting programs, and the CBM 8032 had fairly good times in the disk tests.

Aside from the accounts receivable problem, each system is run through a series of standard exercises and real-life program simulations, which are reported on in the full Benchmark Reports published by ACU. The exercises include tests of speed for math functions and disk access. Other real-life application problems include a new product development problem and a scientific/engineering test.

As always, we caution readers about over-emphasis on the results of benchmark tests. While the tests are a useful comparison of actual execu-



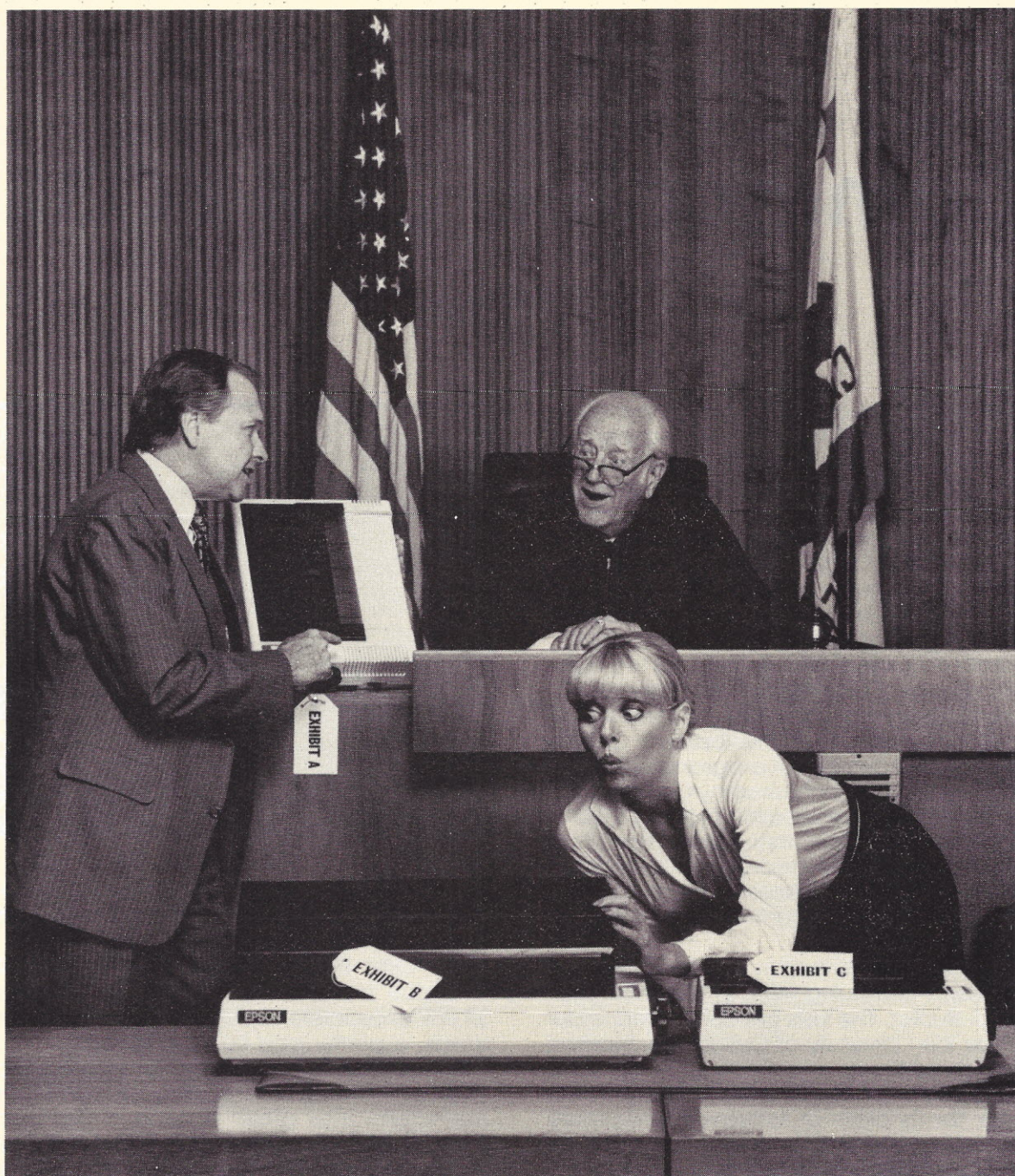
tion speed in a practical environment, they say nothing about important factors such as software availability and product support.

The CBM 8032 system as tested cost \$4,085. The price included the display and keyboard, 32,000 characters of memory, two mini-floppy disk drives, a printer and Basic language.

The keyboard and display are contained in a single unit along with the processor and memory. The screen uses green phosphor, displaying 25 lines of 80 characters each. A set of 64 graphics characters is included, as well as standard alpha-numeric characters in upper and lower case. The graphics characters are labeled on the keys and can be used in connection with a control key.

The disk drives, housed in a separate table-top cabinet, store 509K bytes each for a total of about one million characters. The drives are an optional item; without them, the system sells for \$1,495. Now available are additional drive systems, including 5- and 10-million character Winchester hard disks.

Commodore offers several printers, a modem, and a cassette recorder as accessories. The printer used in testing was a 65 cps dot matrix unit made by Epson, which cost \$795. It is a unidirectional printer with a tractor feed that accepts paper up to 10 inches wide, and is capable of printing the graphics character set. Our benchmark team noted some minor problems with the printer. The



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| | C-3 Accounts Receivable Time (min.) | Current Price | to be covered in future issues |
|-----------------------------|--|------------------|--------------------------------|
| Commodore CBM-8032 | 3:36.0 | \$ 4,085 | Smoke Signal Chieftan |
| SD Systems SD-200 | 6:16.4 | \$12,300 | Vector Graphic 3005 |
| Billings BC-12 DF2M | 5:09.2 | \$12,395 | Xerox 820 |
| Dynabyte 5300 | 4:38.0 | \$ 7,735 | IBM Personal Computer |
| NEC Astra 205 | 5:10.8 | \$ 9,890 | IBM 5120 |
| Altos ACS8000-15 | 10:41.5 | \$ 9,875 | |
| Wang 2200SVP | 2:23.0 | \$14,600 | |
| Pertec PCC 2000 | 6:04.3 | \$12,470 | |
| North Star Horizon | 1:57.7 | \$ 6,911 | |
| Cromemco System Two | 2:48.0 | \$ 9,275 | |
| Texas Instruments 771 | 3:38.1 | \$12,100 | |
| Vector Graphic System B | 5:56.5 | \$ 8,995 | |
| DECstation 78 | 4:21.5 | \$10,495 | |
| Radio Shack TRS-80 Model II | 3:38.6 | \$ 7,609 | |
| Apple II+ | 6:17.4 | \$ 4,330 | |
| Digital Microsystems DSC-2 | 3:28.8 | \$ 9,015 | |
| Ohio Scientific C3-A | 15:49.3 | \$10,940 | |
| Alpha Micro AM-1011 | 3:25.3 | \$15,605 | |
| Data General CS/10 Model C1 | 2:40.3* | \$13,400 | |

*Time obtained using hard disk

Benchmark comparison

feed mechanism sometimes slipped, sending the paper out of alignment.

The software controlling printer operation was also criticized. It takes three statements to open and close the use of the printer device. "Printing is cumbersome," said one user. "You have to use too many magical commands that don't seem necessary."

Other printers offered for the system include a 150 cps bidirectional printer and a 40 cps daisy-wheel letter quality printer. The modem offered by Commodore is a 300 baud unit, which users said worked well. However, the system needs an optional interface unit in order to use the modem, since it comes with an IEEE-488 rather than RS-232 interface.

The Commodore version of Basic is not very enhanced compared to others we've looked at. It has fewer statement types, especially those used in a structured programming approach, and lacks a PRINT USING command for formatting numerical output. Disk I/O is particularly cumbersome because the user must trap for all disk errors and print a rather uninformative error message instead of having the system handle this.

Our benchmark team praised the program editor, which they called "one of the easiest we've used." Rather than a line-by-line approach found in most Basic editors, the Commodore system has

a screen-oriented editor, which allows the user to scroll from line to line and make changes.

A total of 14 users were interviewed during the survey portion of the benchmark study. These included several science labs using it to maintain and access databases, a police department, businesses and schools teaching programming. All but three of the users were doing some programming.

Users were generally pleased with the system and said their dealers had been supportive, but documentation was viewed as inadequate. Many were relying on the *Pet/CBM Personal Computer Guide*, published by Osborne/McGraw Hill (Berkeley, CA).

The system has some drawbacks, but is functional as a business computer if appropriate software can be run. □

Research Associate: Vic Schoenberg

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members all over the U.S., Canada and several other foreign countries. A complete package of information is available from ACU, Box 9003, Boulder, CO 80301.

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SPECIAL REPORT





Buyer's Guide: Inventory Control Software

by Carl Heintz, C.P.A.

Whether it's the local record shop needing information about which albums are the hottest, or the manufacturer who needs to track the investment in work-in-process, inventory programs are a natural application for micro-computers. The many available inventory programs are almost as varied as are the machines themselves.

The accompanying charts are based upon information supplied during polls we conducted among various software manufacturers. While comprehensive, the list cannot possibly include all worthwhile inventory packages on the market. However, the list includes many excellent choices for the discriminating buyer. An effort will be made to include any omissions in forthcoming updates to our ongoing series of software reports.

Obviously, one of the most important elements of good management is a control over inventories. An accurate picture of quantity and cost is critical. Let's explore the nature of a good automated inventory program and provide some valuable criteria for evaluation.

To begin with, a system must have the capacity to handle the current volume and number of items in stock—plus provide some room for growth. This necessitates a hardware system, with sufficient capacity: in all but the smallest companies, it is unlikely that small disk systems (such as that found on the Osborne) will suffice. Most of the systems included in the accompanying comparison charts will easily handle from 800 to 1,000 items—a quantity sufficient for most applications.

Raw specifications on items accommodated by the system can be meaningless statistics unless one understands what type of information the system will contain. In the

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charts, we have indicated some data fields that can be tracked in an inventory system.

Some basic accounting is in order at this point, since the whole field of inventory management is at the very core of accounting. To begin with, there are two basic types of inventory management approaches: the *perpetual* method and the *periodic* method.

In the perpetual approach, each item in inventory—whether it be a raw material or finished good—is kept track of by individual component. Most small businesses utilize the periodic method, since they don't need to keep detailed records of each and every item of inventory. There may be a count of finished goods and perhaps a rough count of raw materials, but generally no one keeps records on how much of each and every item is on hand. The same approach is taken in most small retail establishments and wholesalers. Generally, these companies rely upon a periodic count to establish what the level is at any one time.

There are several reasons for this approach. For one thing, it is a laborious task to track every nut and bolt in the shop. Often the proprietor probably has a good handle on running the business anyway.

A consideration of the two methods of inventory keeping are of fundamental importance when contemplating whether or not to computerize inventory. Almost all existing programs are designed to accommodate the perpetual philosophy. The computer is ideally suited to keeping detailed records. A computerized inventory program in an environment previously oriented towards the periodic method can be chaotic. Instead of saving time and effort, the computer multiplies the effort required by the staff. Every transaction affecting inventory—purchase, re-sale, return, adjustment—must be carefully monitored and entered. Until optical character scanners and robots become more commonplace, someone will have the responsibility of feeding the computer the information it needs.

Since the programs are oriented to perpetual records, the data input requirements can be staggering to a company that hasn't kept detailed records. Proper implementation warrants a careful consideration of the value of the information to be gained from a perpetual inventory system against the additional costs involved.

In some cases, the cost of obtaining the information can be lessened if the task of input is minimized by sharing the overhead with other programs. For example, if the company is intending to utilize an accounts payable system, there may be a way for the information entered by way of the payables program to update the inventory system. Similarly, if the company intends to use an order entry system, the labor involved in entering items relieved from inventory may be reduced.

It's important to note that even if a complete payables system and comprehensive order-entry system are in place, additional information will be necessary. Consider the payables system. Instead of entering just one amount—the amount due the vendor—the inventory system will require the entry of every line item in the vendor's invoice, and perhaps a proration of shipping charges and taxes. The burden can be extensive.

Assume the company already has a perpetual inventory system—index cards, for example. A computerized inventory system may alleviate much pencil pushing. However, there are other factors that come into play. In most index card systems, only quantities are kept. A computerized system will provide costs. The manner in which the inventory is costed may impact the financial statements often linked to the inventory.

Pricing inventory is a science in itself. The user must be allowed to keep records of prices that are appropriate for the method of inventory used by the company. There are several methods: Average cost, First-In First-Out (FIFO) and Last-In First-Out (LIFO). These methods may be illustrated by a simple example. Assume that the company has been buying widgets for the past year. The statistics are as follows:

| Date | Price | Quantity |
|-------|-------|----------|
| 1/1 | \$1 | 10 |
| 4/15 | 2 | 10 |
| 9/15 | 3 | 10 |
| 12/15 | 4 | 15 |

On December 31, the accountant is working up the numbers. He has several options. Under the FIFO method, the assumption is made that the inventory on hand (there are 30 units) represents the last 30 units purchased. The computation of inventory cost would be $15 \times \$4 + 10 \times \$3 + 5 \times \$2$ or a total of \$100. Under the average cost method, the inventory would be calculated at $[(1 + 2 + 3 + 4)/4] \times 30 = \75 . The LIFO method assumes the inventory on hand is the oldest, and it would be calculated at $10 \times \$1 + 10 \times \$2 + 10 \times \$3 = \60 . By a slight of the accounting hand, one can make inventory vary from \$60 to \$100. Of course, the numbers used here are highly screwy—normally prices for widgets don't increase from \$1 to \$4 in the same year. However, the principle and results are valid examples.

For each dollar of change in inventory valuation, the Cost of Goods Sold and ultimately the bottom line are affected. The inventory system, whether it be on a micro or little ledger cards, must be sophisticated enough to handle the variables of each situation. Most of the commercially available software was written by non-accountants, will be installed and brought up in the company by non-accountants and probably will be run by account-

ants with little computer training. Before investing time, money and emotions in an inventory program for the company, a wise move is to consult with the company's CPA for guidance.

There is another entirely different matter that must be considered in choosing an inventory package. So far, the concepts discussed have been appropriate for companies in which the product can be identified, and in which not too much production is taking place. Wholesalers and retailers are the easiest types of inventory systems to program a computer for. Now consider the case of a manufacturer. There are three basic kinds of inventory that a manufacturer has—raw materials, work-in-process and finished goods. Keeping track of raw materials and finished goods is a task at which the ordinary run-of-the-mill inventory package will do just fine. But work-in-process creates problems.

The job-cost area has yet to be exploited effectively by a software vendor.

There are two distinct systems used to account for work-in-process: the *job-cost* method and the *process-cost* method. In the job-cost method, each item work-in-process, or batches of work-in-process are treated as little jobs. When labor, materials and overhead are incurred in manufacturing, they are charged to a job, usually through entries in the accounting records and a little job ticket that accompanies the goods being manufactured. A job cost system is ideal in situations in which each item manufactured is "custom" in some respect or in which the items are manufactured in small lots.

The process-cost system is ideal for manufacturing situations in which large batches are run through several stages in the manufacturing process—such as a chemical manufacturing process or a steel mill. In such instances, there are usually well-defined manufacturing steps, each with its attendant costs. Actual costs may be added at each production stage. Alternatively, and more commonly, estimated "standard costs" of production are used. In a process-cost system, inventory costs are transferred from department to department until they are finally placed in finished goods. In a job cost accounting system, on the other hand, a job cost center is established and costs are posted to it until the products are completed, at which time they are transferred to finished goods.

48 INTERFACE AGE

Most inventory systems are not capable of coping with manufacturing inventory of work-in-process. They are oriented entirely towards the problem of keeping track of finished goods or raw materials. Unfortunately, in a manufacturing environment, the real problem is the work-in-process. Some program houses market so-called "job-cost" systems. These work reasonably well in a small job cost environment, but the whole area has yet to be exploited effectively by a software vendor.

In the survey, we attempted to determine whether any vendors had effective manufacturing inventory systems. Most claimed that their systems were appropriate for a manufacturer with a process-cost system and for one with a job-cost system—all of which leads one to conclude that the vendors really didn't understand inventory accounting.

Some of the most successful inventory systems aren't listed. They are the result of a user designing a custom program using a sophisticated database system, such as Oasis Control. To attempt such a project, is no small undertaking, though it is not recommended for those reluctant to dedicate themselves to a reasonably complex task.

When choosing an inventory package, give special consideration to the on-line inquiry capabilities of the system. There's nothing more frustrating than not being able to get at data in the computer. Another indication of program suitability is the content and format of the reports. Reporting capabilities should be carefully examined. Finally, there is the whole matter of how the program runs. No matter what the manual looks like or how beautiful the print-outs, it is critical that the system run successfully in your business. One of the best ways to establish this fact is to find out about other users of the system—preferably one who has a similar business. A few moments on the phone or a visit to the implementation site will determine the success of the installation. □

Contributing editor Carl Heintz has spoken on microcomputers before discussion groups of the California Society of CPAs. He has taught accounting at both USC and UCLA and received undergraduate and graduate degrees in business administration from the former. He has made numerous presentations on business topics before civic and business groups, including a series to the American Management Associations. In addition to many articles, Mr. Heintz has two books to his credit.

As an accountant and partner in a CPA firm, located in Glendale, CA Mr. Heintz assists numerous clients considering using a microcomputer. He provides advice on how to implement accounting functions in a microcomputer environment.

OCTOBER 1982

Chart A. Company Data

| Vendor | Address | City/State/Zip | Price |
|---|------------------------------|---------------------------|--------------------|
| Adler Computer Technology | 21777 Ventura Blvd. #269 | Woodland Hills, CA 91367 | \$1,750(*A1) |
| Advanced Data Systems | 4010 Long Beach Blvd. | Long Beach, CA 90807 | \$1,000-5,000 |
| Complete Business Services | 190 W. Center | Logan, UT 84321 | \$1,500(*A2) |
| Compumax, Inc. | Box 7239 | Menlo Park, CA 94025 | \$350 |
| Compumax, Inc. | Box 7239 | Menlo Park, CA 94025 | \$140(*A3) |
| Computerware | 4403 Manchester Ave. S-102 | Encinitas, Ca 92024 | \$695 |
| Continental Software | 11223 Hindry Ave. | Los Angeles, CA 90045 | \$1,600 |
| D.B. Software Co. | 11840 NE Brazee | Portland, OR 97220 | \$150(*A4) |
| Dr. Daley's Software | Water Street | Darby, MT 59829 | \$140(*A5) |
| Data Automation Service Int'l. | 2145 NW 10th St. | Gainsville, FL 32601 | \$785-\$2,500(*A6) |
| Data Soft of N.H. | 22 Stevens Ave. | Merrimack, NH 03054 | (*A7) |
| Golden Kee/Computer Consultants | 312 Hoyt St. | Dunkirk, NY 14048 | \$995 |
| Great Plains Software | 123 N. 15th St. | Fargo, ND 58102 | \$595 |
| High Technology Software Products, Inc. | Box 14665 | Oklahoma City, OK 73113 | \$250 |
| C.F. Kerchner & Assoc., Inc. | 5507 Louise Lane-E Allen Twp | Northampton, PA 18067 | \$300 |
| Micro Architect, Inc. | 96 Dothan St. | Arlington, MA 02174 | \$399 |
| Microcomputer Consultants | Box 1377 | Davis, CA 95617 | \$600 |
| Midwest Scientific Instruments | 220 W. Cedar St. | Olathe, KS 66061 | \$9,500-\$50,000 |
| National Software Marketing, Inc. | 4701 McKinley St. | Hollywood, FL 33021 | \$300-\$2,500 |
| Omni Software Systems, Inc. | 146 N. Broad St. | Griffith, IN 46319 | \$495 |
| Open Systems, Inc. | 430 Oak Grove | Minneapolis, MN 55403 | Contact vendor |
| Peachtree Software, Inc. | 3445 Peachtree Rd., N.E. | Atlanta, GA 30326 | \$750 |
| Peachtree Software, Inc. | 3445 Peachtree Rd., N.E. | Atlanta, GA 30326 | \$1,400 |
| Realty Software | 1116 8th St., Ste. E | Manhattan Beach, CA 90266 | \$95 |
| Relational Systems | Box 13850 | Salem, OR 97309 | \$295 |
| SMC Systems and Technology, Inc. | 1011 Rt. 22, Box 6800 | Bridgewater, NJ 08807 | n/a |
| Software Products Int'l, Inc. | 10343 Ruselle St., Ste. A | San Diego, CA 92121 | \$490 |
| Software Technologies for Computers | 430A Main St. | Watertown, MA 02172 | (*A8) |
| Structured Systems Group | 5204 Claremont Ave. | Oakland, CA 94618 | \$750 |
| Systems Plus, Inc. | 1120 San Antonio Rd. | Palo Alto, CA 94303 | n/a |
| TCS Software, Inc. | 3209 Fondren Rd. | Houston, TX 77063 | n/a |
| Technology Systems, Inc. | 2 Griswold St. | Bethel, CT 06801 | \$500 |
| Westware, Inc. | 2455 S.W. 4th Ave. | Ontario, OR 97914 | \$425 |

KEY

(*A1) For "Medpack" Source Code

(*A2) All five for this price

(*A3) Atari version \$200

(*A4) Prices vary; starting from price listed

(*A5) Inventory 3.4 (4032 or 8032 w/4040 disk); Inventory 3.4 (8032 w/8050 disk) \$160

(*A6) Depending on modules specified

(*A7) Cassette \$25; disk \$35

(*A8) \$275 (Apple); \$395 (IBM)

n/a — information not available

OCTOBER 1982

Chart B. Configuration Data

| Vendor | Hardware | Operating System | Other Related programs | | | | | | | Links to other programs |
|---|--|--|------------------------|-----|---------|-----|----------|-------------|--|-------------------------|
| | | | GL | A/R | Payroll | A/P | Job Cost | Order Entry | Other | |
| Adler Computer Technology | floppy and hard disk | CP/M | y | n | n | n | n | n | | n |
| Advanced Data Systems | IBM System 34 | disk | y | y | y | y | y | y | | y |
| Complete Business Services | North Star 64K, Soroc, Hazeltine, TeleVideo and North Star Advantage | North Star DOS and Basic | y | y | y | y | n | n | | n/a |
| Compumax, Inc. | IBM PC, Osborne I, NEC, Apple II | Microsoft Basic under CP/M | y | y | y | y | y | y | | n/a |
| Compumax, Inc | IBM PC, Osborne, Atari | depends on hardware | y | y | y | y | y | y | | n/a |
| Computerware | 6809 System-Smoke Signal SWTPC, Glimix | OS-9 Flex SS B DOS | n | n | n | n | n | y | | y |
| Continental Software | IBM PC minimum 128K, 1M-byte disk storage (floppy or hard) | IBM PC DOS | n | y | n | n | n | y | Sales and inventory analysis, taxes and commissions, royalties payable | y |
| D.B. Software Co. | TRS-80 I, II, III plus IBM PC | TRSDOS/DOS plus and IBM DOS plus hard disk | n | y | n | n | n | y | Purchase order entry | y |
| Dr. Daley's Software | All combinations of the 8000 & 4000 CBM | | n | n | n | n | n | n | | n |
| Data Automation Service Int'l | TRS-80 II -16 | TRSDOS | y | y | y | y | y | y | | y |
| Data Soft of N.H. | TRS-80 I, II, III, 16; printer, cassette, disk | TRSDOS | n | n | n | n | n | n | | n |
| Golden Kee/Computer Consultants | TRS-80 III, 48K, 2 disk, RS-232 | TRSDOS, LDOS | y | y | y | y | n | n | Point of sale | y |
| Great Plains Software | Apple II and Apple III w/UCSD; compatible hard disk | UCSD Pascal | y | y | y | y | y | y | (*B1) | y |
| High Technology Software Products, Inc. | Apple II, 2 or 3 floppy drives, 80-col. printer | Standard Apple DOS | n | n | n | n | n | y | Info. Master (database) Order Scheduler | y |
| C. F. Kerchner & Assoc., Inc. | TRS I and II and Apple I Plus Apple DOS | TRSDOS | n | n | n | n | n | n | | n |
| Micro Architect, Inc. | TRS-80 II, IBM PC and CP/M types | TRSDOS 2, IBM DOS, CP/M 2.2 | y | y | n | y | n | y | IDM-X | y |

Key

(*B1) GL, A/R, AP are the only modules available now.

(*B2) Payroll and order entry to be available soon

(*B3) A/R only.

n/a — information not available

y — yes; feature included

n — no; feature not included



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So is it surprising that the world's first Notebook Computer should come from Epson?

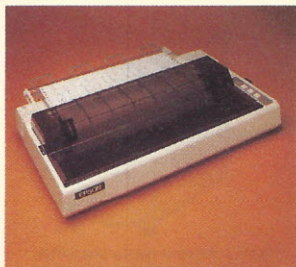
Not to us. You see, we have some other notable feats in our past. Not only the world's first printer, but the world's smallest printer, the world's most reliable printers, the world's first disposable print

head, and now, the world's first portable computer with the power of a desktop.

We intend to be as big in personal computers as we are in printers. And we'll do it the same way. By making computers you can count on to perform. With the options, software and interfaces you need. And by delivering what we promise, at prices people can afford.

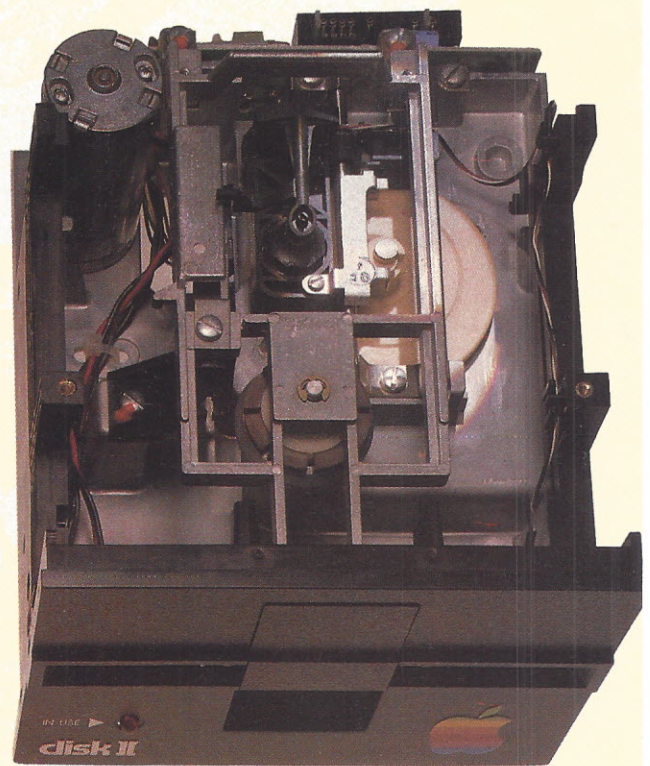
But some people don't think we can do in computers what we've already done in printers. And for them, we have this advice:

Just watch.



EPSON
EPSON AMERICA, INC.

When you say your disk drive has more juice than Apple's, be prepared to cut one open.



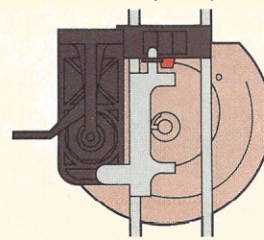
The problem with Apple's disk drive stems from the core.

There are a lot of good reasons why dealers all over America aren't recommending Apple's disk drive. And one of the main reasons is Rana Systems' new Elite Series of Apple II compatible disk drives.

It's easy to see why Apple® has been having some major slipped disk problems. Just look at their antiquated head positioner.

Apple is a registered trademark of Apple Computer Inc.

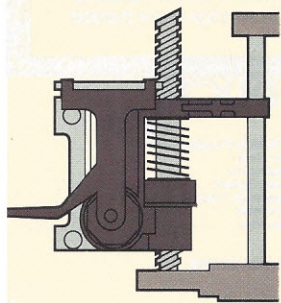
It's plastic. Just like a toy. That's why it can take multiple passes to get the information



Apple's primitive plastic positioner. A workable, but sloppy, way to capture data.

needed. And why the information on your disk can appear obscured and unreadable. If Apple's positioner doesn't accurately center the head over your data tracks, it's no bargain at any price.

Rana knows the head positioner is the heart of the machine, so we didn't cut any corners. To most accurately place the head over the data area we use finely machined lead screws and metal band positioners. They provide you with the fastest and clearest data recognition on the market. With three to four times faster access, track to track. With far greater precision than Apple's, to give you virtually 100% data integrity.



Rana's state of the art technology lead screw and metal band positioners give you vastly improved speed and accuracy.

More juice on Apple's inferiority.

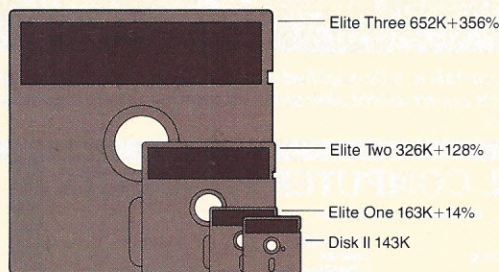
There's another big problem Apple has chosen to ignore. The irritating scratching noise that occurs when it is searching for information. Rana, on the other hand, has built the Elite Series to be virtually noiseless.

And more importantly, Rana has an advanced write protect feature which makes it impossible to lose your information. A simple touch on the front panel's membrane switch gives you failsafe control. Apple of course only has a notch or tab, which gives you only minimal protection.

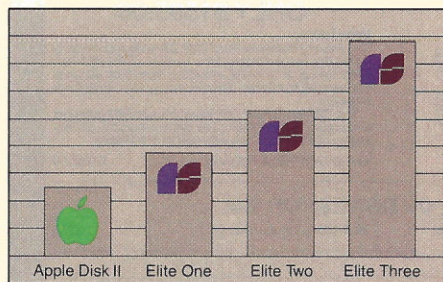
With the superior Elite controller card, you can control up to four floppy disks using only one slot. With Apple's you can only use two. Of course, you can still plug into Apple's controller card, but down the line you'll want to switch to Rana's and save yourself a slot.

Elite also gives you more byte per buck.

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The real beauty of it isn't the beauty of it.

There is no comparison to the lean, clean design of the Elite Series to Apple's 5 year old model (which by the way has never been updated). It's our superior technology, operating economy, increased storage and faster step that makes us the best performing and hottest selling disk drive in America.

So give us a call or write for more information. It doesn't take a lot of courage to cut into an Apple when you outshine them as brilliantly as we do.

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Chart B. Configuration Data (continued)

| Vendor | Hardware | Operating System | Other Related programs | | | | | | | Links to other programs |
|-------------------------------------|---|------------------------|------------------------|-----|---------|-----|----------|-------------|--|-------------------------|
| | | | GL | A/R | Payroll | A/P | Job Cost | Order Entry | Other | |
| Microcomputer Consultants | 8080, 8085, Z80, hard disk | CP/M, MP/M | y | y | n | y | y | n | MRP Purchasing | y |
| Midwest Scientific Instruments | MSI 6800 Computer, dual floppy, hard disk, 10M-byte fixed/removable | Software Dynamics SDOS | y | y | n | y | y | y | | y |
| National Software Marketing, Inc. | TRS-80 II—hard disk or floppy | TRSDOS | y | y | n | n | n | y | | y |
| Omni Software Systems, Inc. | North Star Horizon double density, quad density, and hard disk | North Star DOS | y | y | y | y | y | y | | y |
| Open Systems, Inc. | 64K, 1M byte of storage, diskettes or hard disk | CP/M, MP/M Oasis | y | y | y | y | y | y | | y |
| Peachtree Software, Inc. | Z80, 8080, floppy or hard disk, 80-by-24 VDT, 132-column printer | CP/M—compiled MBasic | n | y | n | n | n | n | Sales invoicing | y |
| Peachtree Software, Inc. | Z80, 8080, floppy or hard disk, 80-by-24 VDT, 132-column printer | CP/M CIS Cobol | n | y | n | n | n | y | sales analysis | y |
| Realty Software | CP/M | CP/M, CBasic | y | y | y | y | | y | fixed assets | y |
| Relational Systems | Z80 and 8080, hard disk | CP/M | y | y | y | n | n | n | | y |
| SMC Systems and Technology, Inc. | several | several | y | y | n | n | n | y | | y |
| Software Products Int'l, Inc. | TRS-80 II, Altos, IBM PC, floppy and hard disk | UCSD Pascal | y ^(*B2) | y | n | y | n | n | Relational databases, Financial Modeling | y ^(*B3) |
| Software Technologies for Computers | Apple II, Apple II Plus, Apple III emulation, IBM PC | DOS 3.3 or MDOS (IBM) | y | y | y | y | n | y | DBMS and mailing list | y |
| Structured Systems Group | 80-column CRT, 1/2M-byte mini-storage, 132-column printer w/form feed | CP/M CP/M86 MP/M | y | y | y | y | n | y | analyst report writer | y |
| Systems Plus, Inc. | Z80, 8080, 8085 processors, 8-in., 5 1/4-in., and/or hard disk | CP/M, MP/M, IOS, CDOS | y | y | y | y | n | y | | y |
| TCS Software, Inc. | CP/M, 64K | CP/M | n | n | n | n | n | y | | y |
| Technology Systems, Inc. | North Star Horizon, Advantage, CP/M machine | North Star DOS or CP/M | y | y | y | y | y | y | | y |
| Westware, Inc. | Apple II, III (emulation) Corvus hard disk | Applesoft/DOS | y | y | y | y | y | n | Database cycle billing | y |

Key

(*B1) GL, A/R, AP are the only modules available now.

(*B2) Payroll and order entry to be available soon

(*B3) A/R only

n/a — information not available

y — yes; feature included

n — no; feature not included

Chart C. Inventory program features

| Vendor | Typical item capacity | Stock Number | Manufacturer's Number | Product class or code | Source (i.e., vendor) | Delivery time | Description | Sales price | Quantity discount prices | Major customers | Date inventory purchased | Inventory reorder point | Returns (units) | Returns (costs) | Reverse quantities |
|---|--|--------------|-----------------------|-----------------------|-----------------------|--------------------|-------------|--------------------|--------------------------|-----------------|--------------------------|-------------------------|-----------------|-----------------|--------------------|
| Adler Computer Technology | (^{*C1}) | n | n | n | n | n | n | n | n | n | n | n | n | n | n |
| Advanced Data Systems | no limit | y | y | y | y | y | y | y | y | y | y | y | y | y | y |
| Complete Business Services | n/a | y | n | n | n | n | y | n | n | n | y | y | n | n | n |
| Compumax, Inc. | 900-1,100 | y | n | y | y | n | y | y | n | n | n | y | n | n | n |
| Compumax, Inc. | n/a | y | n | y | n | y | y | y | n | n | n | y | n | n | n |
| Computerware | no limit | y | y | y | y | y | y | y | y | n | n | y | n | n | n |
| Continental Software | 1,000+ | y | (^{*C3}) | (^{*C3}) | (^{*C3}) | (^{*C3}) | y | (^{*C3}) | (^{*C3}) | y | y | (^{*C3}) | y | y | y |
| D.B. Software Co. | 1,400 | y | y | y | y | n | y | y | n | n | n | y | n | n | y |
| Dr. Daley's Software | 2,088 (4,040 disk drive) 6,450 (8,050 disk drive) | n | n | n | n | n | n | n | n | n | n | n | n | n | n |
| Data Automation Service Int'l | 3,000 | y | n | y | y | n | y | y | y | n | n | y | n | y | n |
| Data Soft of N.H. | 144-600+ | y | n | n | n | n | y | y | n | n | n | y | n | n | n |
| Golden Kee/Computer Consultants | 1,000 | y | y | y | y | y | y | y | y | n | n | y | y | y | y |
| Great Plains Software | 30,000 part number | y | y | y | y | y | y | y | y | n | n | y | y | n | y |
| High Technology Software Products, Inc. | 1,160 | y | y | n | y | n | y | y | n | y | n | y | n | n | n |
| C. F. Kerchner & Assoc., Inc. | a multi-level system (^{*C4}) | y | n | y | n | n | y | n | n | n | n | y | n | n | n |
| Micro Architect, Inc. | 7,000-28,000 | y | n | (^{*C6}) | y | n | y | y | n | n | n | y | n | n | n |
| Microcomputer Consultants | 32,000 w/8M-byte hard disk | y | y | y | y | y | y | y | y | n | y | y | n | n | y |
| Midwest Scientific Instruments | 3,000 (^{*C7}) | y | y | y | y | n | y | y | n | n | y | y | n | n | n |
| National Software Marketing, Inc. | Up to 10,000 | y | y | y | y | n | y | y | y | n | y | y | n | n | n |
| Omni Software Systems, Inc. | 6,000-10,000 | y | n | y | y | n | y | y | n | n | y | y | n | n | n |
| Open Systems, Inc. | unlimited (^{*C8}) | y | y | y | y | n | y | y | y | n | y | y | n | n | y |
| Peachtree Software, Inc. | 855 = ~923 items | y | y | y | y | n | y | y | y | n | y | y | y | y | n |
| Peachtree Software, Inc. | approx. 2,300 items on 855 | y | y | y | y | n | y | y | y | y | y | y | y | y | y |
| Realty Software | 1,000/disk | y | y | y | y | n | y | y | n | n | y | y | n | n | n |
| Relational Systems | function of disk capacity | y | n | y | n | n | y | y | n | n | n | y | n | n | n |
| SMC Systems and Technology, Inc. | system defined | y | y | y | y | n | y | y | y | y | n | y | n | n | n |
| Software Products Int'l, Inc. | n/a | y | n | y | y | y | y | y | n | n | y | y | y | y | y |
| Software Technolgoies for Computers | 1,200 | y | y | y | y | n | y | y | n | n | y | y | y | y | y |
| Structured Systems Group | 8½-in. std. system = 2,500 items (^{*C11}) | y | y | y | y | n | y | y | n | n | y | y | n | n | n |
| Systems Plus | n/a | y | y | y | y | n | y | y | n | n | n | n | y | y | y |
| TCS Software, Inc. | disk or media capacity | y | y | y | y | n | y | y | y | n | y | y | y | y | y |
| Technology Systems, Inc. | 9,000 | y | y | y | y | n | y | y | n | n | n | y | n | n | y |
| Westware, Inc. | 1000 on 5¼-in. 8,800 on 5M bytes 28,000 on 10M bytes | y | y | n | y | n | y | n | n | n | n | y | n | n | n |

Key

(^{*C1}) Designed for optometrist's office

(^{*C2}) Medpack controls all patients in office for annual check-ups, recalls, one GL.

(^{*C3}) Shelf-life and last sale, etc. can be logically determined based on inventory rotation assumption.

(^{*C4}) 200 finished goods, 130 assemblies, 110 subassemblies, 1,005 parts

(^{*C5}) Some features of the system are: inventory level reports, parts lists, where-used reports, accounting reports, worksheets, on order reports, part pick lists/pull sheets, auto posting of pick lists, MRP reports, intended bill-of-materials reports, bill-of-material processing, etc.

(^{*C6}) Location code can be used; tells where item is located in warehouse

(^{*C7}) Limited by size of storage; can be larger or smaller than 3,000

(^{*C8}) 10,000 parts require 1.7M bytes storage.

(^{*C9}) Cost by LIFO layers (# layers 3)

(^{*C10}) Tracks serial numbers or lot numbers w/expiration dates

(^{*C11}) Limited by disk storage

n/a — information not available

y — yes; feature included

n — no; feature is not included

Chart C. Inventory program features (continued)

| Vendor | Quantity on hand | Quantity on order | Quantity sold year-to-date | Quantity sold month-to-date | Minimum order quantity | Quantity on back order | Cost by FIFO | Cost by Average Cost | Cost by LIFO layer | Date inventory will spoil | Prior costs of items | Sales—dollars, year-to-date | Sales—dollars, period-to-date | Other |
|---|------------------|-------------------|----------------------------|-----------------------------|------------------------|------------------------|--------------|----------------------|--------------------|---------------------------|----------------------|-----------------------------|-------------------------------|--|
| Adler Computer Technology | n | n | n | n | n | n | n | n | n | n | n | y | y | |
| Advanced Data Systems | y | y | y | y | y | y | y | y | y | y | y | y | y | |
| Complete Business Services | y | y | y | y | n | y | y | y | y | n | n | y | y | |
| Compumax, Inc. | y | n | y | n | n | n | n | y | n | n | n | n | y | assembly cost, Aug./month |
| Compumax, Inc. | y | y | y | n | n | n | n | y | y | n | n | n | n | units used |
| Computerware | y | y | y | n | y | y | n | y | n | n | n | n | n | |
| Continental Software | y | y ^(C3) | y | y | y | y ^(C3) | y | y | y | ^(C3) | y | y | y | mfrs serial # for controlled inventory items; multiple levels or options |
| D.B. Software Co. | y | y | y | y | y | y | n | n | n | n | n | n | n | cost & manufacturer's name, purchases month-to-date, adjustments month-to-date |
| Dr. Daley's Software | n | n | n | n | n | n | n | n | n | n | n | n | n | the user has 79 characters with which he defines info. stored for each item |
| Data Automation Service Int'l | y | y | y | y | n | y | n | y | n | n | n | y | y | warehouse information |
| Data Soft of N.H. | y | y | n | n | n | n | n | n | n | n | n | n | n | |
| Golden Kee/Computer Consultants | y | y | y | y | y | y | n | y | n | n | y | y | y | serial # comments, user—definable periods, adjustments monthly sales figures |
| Great Plains Software | y | y | y | y | y | y | y | y | y | n | y | y | y | |
| High Technology Software Products, Inc. | y | y | n | y | n | y | n | n | n | n | n | y | y | sales dollars month-to-date |
| C. F. Kerchner & Assoc., Inc. | y | y | n | n | n | n | n | y | n | n | y | n | n | storage location ^(C5) |
| Micro Architect, Inc. | y | y | y | n | y | y | y | y | y | n | n | n | n | location |
| Microcomputer Consultants | y | y | y | y | y | n | n | y | n | n | n | y | y | location unit, purchase cost period |
| Midwest Scientific Instruments | y | y | n | y | y | n | n | n | n | n | n | n | n | |
| National Software Marketing, Inc. | y | y | y | y | y | n | n | y | n | n | n | y | y | |
| Omni Software Systems, Inc. | y | y | y | y | y | y | n | y | n | n | n | y | y | |
| Open Systems, Inc. | y | y | y | y | y | y | y | y | ^(C9) | n | n | y | y | tax code |
| Peachtree Software, Inc. | y | y | y | y | y | y | n | y | n | n | y | y | y | last time or reorder report |
| Peachtree Software, Inc. | y | y | y | y | y | y | n | y | n | y | y | y | y | ^(C10) |
| Realty Software | y | y | n | n | y | n | n | n | n | n | y | n | n | |
| Relational Systems | y | n | n | n | n | n | n | y | n | n | n | y | y | |
| SMC Systems and Technology, Inc. | y | y | y | y | n | y | y | y | y | n | n | y | y | |
| Software Products Int'l, Inc. | y | y | y | y | y | y | n | y | n | n | y | n | n | physical inventory adjustments |
| Software Technologies for Computers | y | y | y | y | y | y | y | y | n | n | y | y | y | location and last date ordered, unit of measure (i.e., lbs., tons) |
| Structured Systems Group | y | y | y | y | y | y | n | y | n | n | n | n | n | |
| Systems Plus | y | y | y | y | y | y | n | y | n | n | n | y | y | |
| TCS Software, Inc. | y | y | y | y | y | y | n | y | n | n | y | y | y | |
| Technology Systems, Inc. | y | y | y | y | y | y | n | y | n | n | n | n | n | |
| Westware, Inc. | y | y | y | y | y | n | n | y | n | n | n | n | n | last transaction date, unit of measure |

Chart D. Suitable applications

| Vendor | Manufacturers w/process cost system; used for all inventory | Manufacturer with job cost system; used for all inventory | Manufacturer—used for finished goods; raw materials | Wholesaler with a few large items | Wholesaler with numerous small items | Furniture store | Grocery store | Hardware store | Restaurant | Jewelry store | Appliance store | Auto Parts store | Other |
|---|---|---|---|-----------------------------------|--------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------------------|
| Adler Computer Technology | n | n | n | n | n | n | n | n | n | n | n | n | optometrist's office |
| Advanced Data Systems | y | y | y | y | y | y | y | y | y | y | y | y | |
| Complete Business Services | n | n | n | n | n | y | n | y | n | y | y | y | |
| Compumax, Inc. | n | y | y | n | n | n | n | n | y | n | n | n | |
| Compumax, Inc. | n | n | n | y | y | y | y | y | n | y | y | y | |
| Computerware | y | n | y | y | y | y | n | y | n | y | y | y | |
| Continental Software | n | y | n | y | y | y | n | y | n | y | y | y | |
| D.B. Software Co. | n | n | n | y | y | y | y ^(*D1) | y | n | y | y | y ^(*D2) | |
| Dr. Daley's Software | n | n | y | y | y | y | n | n | y | y | y | y | |
| Data Automation Service Int'l | y | y | y | y | n | y | n | n | y | y | y | n | |
| Data Soft of N.H. | n | n | y | y | n | y | n | n | y | y | n | n | |
| Golden Kee/Computer Consultants | n | n | n | n | y | y | y | y | n | y | y | y | |
| Great Plains Software | y | y | y | y | y | y | n | y | n | y | y | y | (*D3) |
| High Technology Software Products, Inc. | n | n | n | y ^(*D4) | n | y | n | n | n | y | y | y | (*D5) |
| C. F. Kerchner & Assoc., Inc. | n | n | y ^(*D6) | n | n | n | n | n | n | n | n | n | |
| Micro Architect, Inc. | n | n | n | n | y | y | y | y | y | y | y | y | |
| Microcomputer Consultants | y | y | y | y | y | y | n | y | n | y | y | y | |
| Midwest Scientific Instruments | y | y | y | y | y | n | n | y | n | n | y | y | |
| National Software Marketing, Inc. | n | n | y | y | y | y | y | y | n | y | y | y | |
| Omni Software Systems, Inc. | n | y | y | y | y | y | y | y | y | y | y | y | |
| Open Systems, Inc. | n | y | y | y | y | y | y | y | n | y | y | y | |
| Peachtree Software, Inc. | n | n | y | y | y | y ^(*D7) | y ^(*D7) | y ^(*D7) | y ^(*D7) | y ^(*D7) | y ^(*D7) | y ^(*D7) | (*D7) |
| Peachtree Software, Inc. | n | n | y | y | y | y ^(*D8) | n | n | n | n | y ^(*D8) | y ^(*D8) | (*D8) |
| Realty Software | n | n | y | y | y | y | y | y | n | y | y | y | |
| Relational Systems | n | n | n | y | y | y | y | y | y | y | y | y | (*D9) |
| SMC Systems and Technology, Inc. | y | n | y | y | y | y | y | y | y | y | y | y | |
| Software Products Int'l, Inc. | n | n | y | y | y | y | y | y | y | y | y | y | |
| Software Technologies for Computers | y | y | n | y | y | y | y | y | y | y | y | y | (*D10) |
| Structured Systems Group | n | n | n | y | y | y | y | y | y | y | y | y | |
| Systems Plus | n | n | y | y | y | y | y | y | y | y | y | y | |
| TCS Software, Inc. | n | n | y | y | y | y | n | y | n | n | y | y | |
| Technology Systems, Inc. | y | y | y | y | y | n | n | y | n | y | y | y | |
| Westware, Inc. | y | y | n | y | y | y | y | y | y | y | y | y | |

Key

(*D1) Includes date purchased, date inventory will spoil, cost by average

(*D2) Special system is available with the following: dealer price, jobber price, alternate item number (all added for auto parts dealers).

(*D3) All checked items are either in Version I or Version II.

(*D4) Up to 1,160

(*D5) The Store Manager is ideal for any small business (retail or wholesale) that requires point-of-sale and inventory control functions.

(*D6) Map planning

(*D7) Does not have point-of-sale

(*D8) Does not have point-of-sale

(*D9) Since disk capacity determines item #, this is useful for any business desiring an accurate no-frills system to handle inventory control functions.

(*D10) Also small electronics company, auctioneer with inventory

n/a — information not available

y — yes; feature included

n — no; feature is not included

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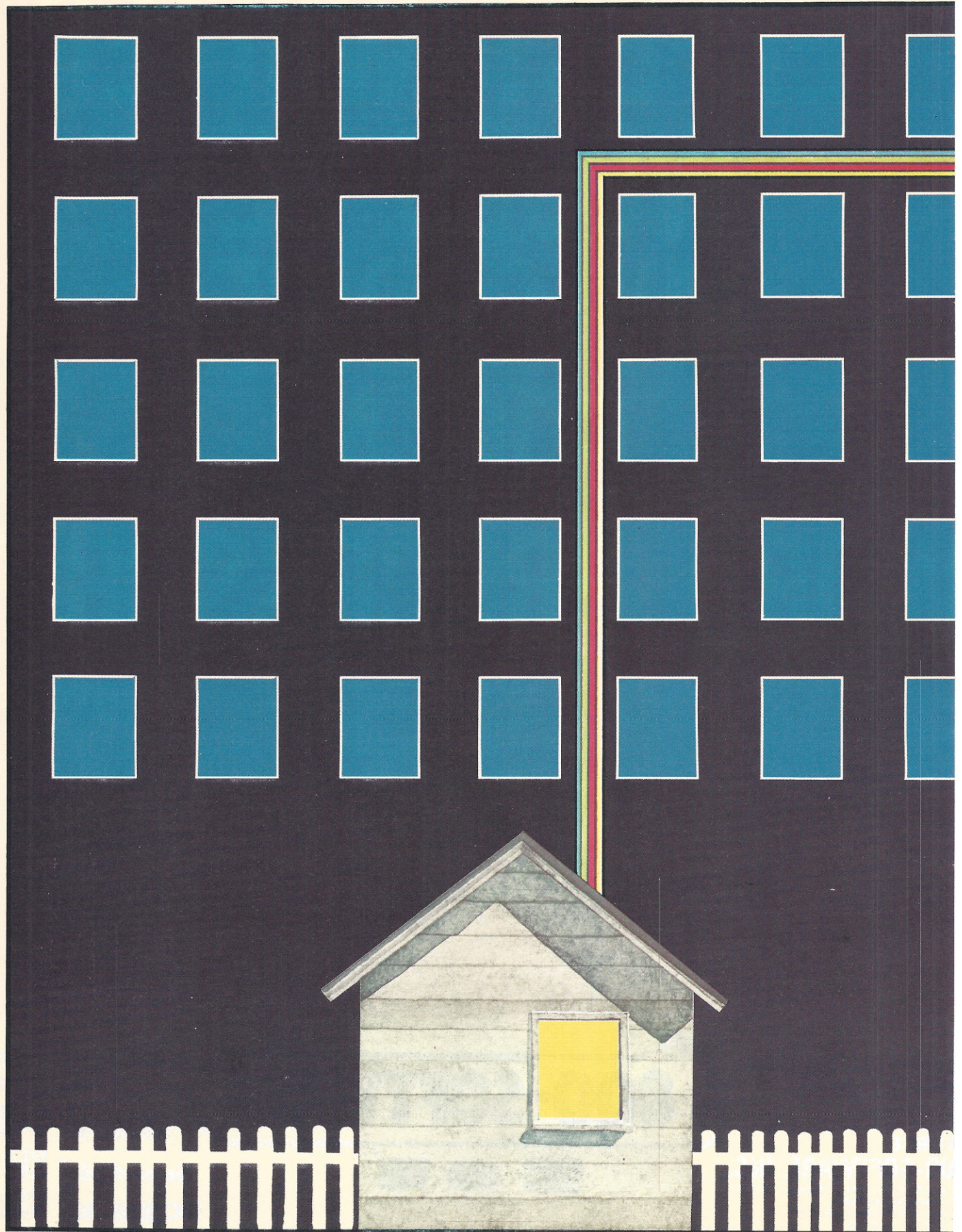
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APPLICATION






Telecommuting: Toward an Extended Office

by Dan W. Post

Many commuters are fed up with the traffic glut and offended by the grit of public transportation. More often than not, the old Detroit-born V-8 is taking longer to catch its breath after the bumper-to-bumper crawl to and from the office. Today's worker is torn between trading the ailing wheels for a one-way ticket to New Zealand—or mortgaging the townhouse to acquire a Mercedes. Fortunately, a less drastic solution is at hand: telecommunications. Would-be commuters now have the opportunity to access their offices via timesharing and database networks through their living room telephones. As a result, central office facilities will be diffused with increasing regularity.

An employee's individual station at home can be tied directly into the company's mainframe, mini or micro. Such portable information gives birth to a new concept—the *extended office*. The traditional belief that businessmen must journey daily from suburbia to a business



district is rapidly fading. *Traveling* to work is no longer essential to *doing* the work.

Many business tasks can be efficiently accomplished via remote communications. Custom spreadsheet models and word processing files may be collected and instantly transmitted to another computer. Budgeting or sales forecasting can be quickly consolidated from outlying machines to a central system. Data from mainframes may be easily downloaded for remote review and update on a personal micro.

Billed as everything from the "Paperless Society" to the "Information Age," this new era has spawned a variety of social implications—particularly with regard to labor relations and the modification of traditional management practices. More than half of the full-time American labor force now works exclusively with information, but ten times as much capital has been invested in technology for factory workers as compared to office workers. Though office costs have been rising at the rate of almost 20% a year and are likely to double over the next five years, integration of this automation into the typical business environment is a recent phenomenon. Taking the office into the home represents the state-of-the-art.

This development logically follows the ongoing media push towards micros in the office. Due in part to this consumer marketing ploy from manufacturers, the new technology is regarded in spreading quarters as a prodigious remedy for the ills of American business. Despite high interest rates and a generally lethargic economy, buying activity for small business automation remains high. Many existing office procedures have become antiquated almost overnight.

Consumers bought more than 800,000 personal computers during 1981. At least 75% of these were for business use. Shipments of electronic office products—allegedly worth \$18 billion in 1982—are expected to grow to \$30 billion in 1985. Individual units are typically becoming 30% less expensive each year. The proliferation of microprocessor-based equipment has fostered much interest in linking individual units through different types of networking. If the computers are separated by more than the length of an interface cable, the easiest way to tie them together is via existing telephone lines. Such networks invoke dispersed information—permitting files in many locations and remote access to them.

By extending office duties to the home through these existing "transmission highways," corporations would have to provide less of the overcrowded floor space—costing an average of \$7.00 a square foot per month. Interestingly, the median vacancy rate for 17 major cities has risen from 2.3% to 5.8% in the last year.

No single marriage of technologies, however in-

triguing, can solve our nation's economic problems—but a passing degree of computer literacy coupled with an understanding of teleprocessing options is fast becoming a prerequisite to productivity for most white-collar workers. Hobby-level association with personal computers has provided many with a head start.

By 1985, advanced electronic communications equipment is expected to be used by four of every five office workers. People with no previous exposure to these futuristic tools are discovering the need to better understand them. Differences between the once separate technologies of word processing, data processing and telecommunications have become blurred. Even distinctions between mini and microcomputers are less evident.

Parallel to this high-tech transition, economic forecasters are predicting that the current administration's policies, the Middle-East conflict and a deceptive surplus of foreign oil will lead to a third major oil crisis before 1990. The two earlier oil crises, in 1973-74 and 1979-80, cost the U.S. and other Western nations \$1.2 trillion in lost economic growth, contends energy expert Daniel Yergin of Harvard University. He believes current petroleum prices will double by the year 2000.

If one-seventh of our urban transit could be replaced by telecommuting, we wouldn't need foreign oil...

According to Jack M. Nilles, who is credited with coining the phrase *telecommuting* (see sidebar), transportation accounts for about one-fourth of our national energy consumption. He claims that for every 1% replacement of urban commuting by telecommuting, the national gasoline bill would be reduced by 5.4 million barrels per year. If we replaced one-seventh of our urban transit with telecommuting, we might no longer have to import oil.

This vibrant alternative to more familiar workstyles is no longer limited to academic speculation and the clairvoyant writings of popular social thinkers like Alvin Toffler. Obviously, employers must adapt new production standards to the resulting cottage industry. Supervision becomes a problem, as do existing criteria for employee compensation. The effectiveness of a telecommuter can be loosely measured by log sheets and frequent phone calls.

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Production standards and quotas can help to establish salaries, but these evaluations are usually based on faith. Any type of cottage industry is difficult to regulate. Also, the question of who should underwrite the terminal investment and phone expenses goes unanswered. If they supplant use of the personal car and gasoline consumption, would they be the user's obligation?

Nilles' studies have indicated the potential for a hybrid approach to offset resistance from established social tradition and discourage worker exploitation. "Not all telecommuting will be done from the home. Most of tomorrow's participants will work at places *near*—but not *at*—home. For one thing, people generally like to get out and meet others. Aside from the desirability of social interaction, some of the new technologies are simply more effective in traditional office situations. The monolithic set of offices that one thinks of as the company headquarters could be split into several regional offices interconnected by high speed communications. Each would be situated near a concentration of the residences of the organization's current or prospective employees. On an average work day, the employee would travel a short distance to the

office nearest home, regardless of the nature of the job. Work will move to the worker, not vice versa," he predicts.

Fred Williams, author of *The Communications Revolution*, and Professor at USC's Annenberg School of Communications, agrees that just as the industrial age and transportation advances spawned the growth of cities, the post-industrial age will encourage new configurations of housing patterns.

Worker satisfaction can be significantly elevated if tedious drives are reduced or eliminated. Consequently, actual productivity may rise. The merits of individual telecommuting networks can be evaluated according to this worker productivity. It equates to the generation of more work of a higher quality at reduced expense. Of course, not everyone is suited to the independence that an extended office provides.

People impaired by physical disabilities, or those obligated to supervise small children may stand to gain the most from this trend. A new bank of human resources becomes available. "The employer is freed from geographical restrictions in attracting competent and productive workers," observes Dr. Nilles. In any regard, benefits accrue

Futurist Leads Study on Microcomputers' Effect on Business

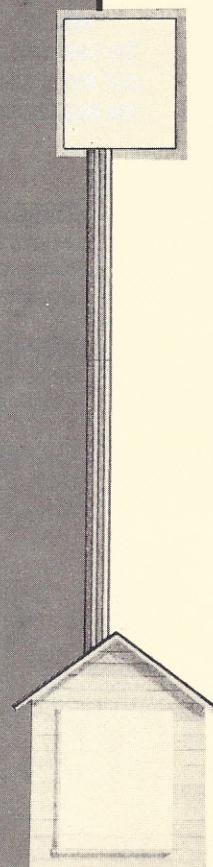
Dr. Jack M. Nilles is internationally recognized for his evaluations of the business and social impacts of computer and telecommunications technologies. One of these research efforts on the consequences of substituting telecommunications and computers for the commute to work—*telecommuting*—formed the basis for the chapter on the "electronic cottage" in Alvin Toffler's *The Third Wave*. Earlier, he directed a series of research programs for the U.S. military and civilian space programs when he was associated with the Aerospace Corporation and TRW. He has written three books and published numerous articles.

Currently serving as the Center for Futures Research senior associate at USC's Graduate Schools of Business Administration, he has launched a two-year study to help computer users and producers deal with the opportunities—and possible disasters—inherent in office automation.

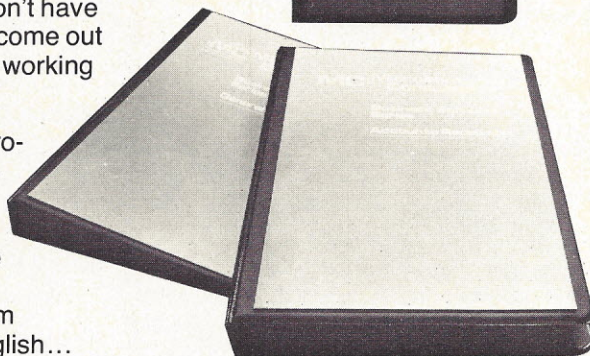
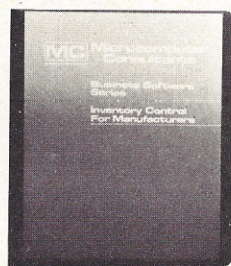
"Technology may change rapidly," Nilles explains, "but people don't. There's always the problem of fitting the technology to the needs and attitudes of its users."

The project will review existing corporate information management policies and examine alternative organizational futures involving microcomputers. It will be completed in three phases. In the first, the technology and market forecasts for personal computers will be updated from earlier estimates. The second phase will access the potential impacts of technological and market developments, examining the alternative futures made possible by the technology. The final phase will be concerned with formulating strategic options for the best use of personal computers.

Continued . . .



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to individuals already comfortable in an isolated environment, such as accountants, writers, typists, researchers and other specialists who do not limit themselves to a 40-hour work week or need daily face-to-face contact with associates. Home terminals enable work to be performed evenings, weekends and during inclement weather. Some theorists believe that although this flexibility is a potential boost to the creative process, it may make the separation between home and business lives difficult.

Estimates are suggesting that 15-20% of the workforce will be "computing to work" by the turn of the century, but merely doing things in a more effective manner through personal automation takes a backseat to cost considerations. Today's economy will probably inhibit unbridled enthusiasm over the new electronics—even for otherwise progressive companies. Even if an enterprise has the capital to invest, design parameters for any inter-

connected system must be subjected to discerning evaluation. Today's innovation is often made obsolete by tomorrow's new product introduction. Provision should be made for future growth and changes in technology (see sidebar).

No system standards have been defined for this innovative method of doing business. Obviously, minimum generic configuration would require a computer at home and one at work, each equipped with a modem and the appropriate telecommunications software. Before telecommuting becomes a universal alternative, this software must be made more reliable, accessible and affordable. Also, the microcomputer will probably need to accommodate word processing, financial planning, graphics and other diverse operations without a change of programs. As this user-oriented software integration mates with more cost-effective hardware, the personal computer will become the

Futurist's study . . .

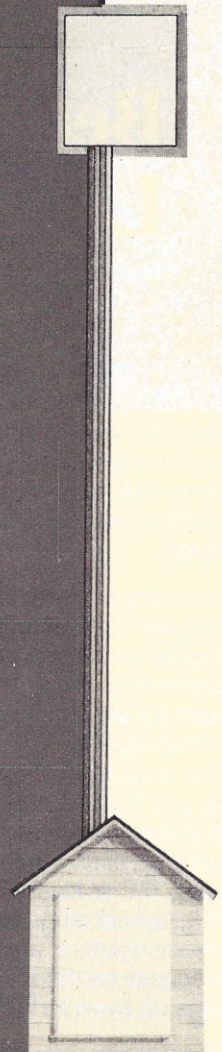
A few of the specific areas to be investigated are:

- How to allocate information processing resources among micro, minis and mainframe computers.
- The effects of the use of micros on organizational communications and organizational stability.
- Compatibility among corporate micros and between the micros, minis and mainframes.
- Productivity changes wrought by the use of micros, and the total costs, risks and benefits—both tangible and intangible—of their use.
- New marketing opportunities for both technology suppliers and users as millions of consumers buy micros over the next 20 years and connect them to telecommunications networks.
- Growth rates of various microcomputer and telecommunications markets and the interactions between various business, consumer and education markets.
- Consumer demands for microcomputer-based capabilities formerly associated only with mainframes—moderate to large databased, 'expert' systems, language-based architectures (for example, LISP machines), high-resolution graphics, multimedia systems (data, voice, pictures), and the like.

Among the organizations sponsoring the study are American Telephone and Telegraph Co., ARA Transportation, Fairchild Semiconductors, Northrop Corp., Safeco Corp., Xerox Corp. and the U.S. Postal Service. Representatives of the sponsors will serve on a research council to help define the scope of the study and select critical issues for examination. In addition, sponsors will have continuing access to the generated data.

Organizations wishing to take part in the study may write to Dr. Nilles at the USC Graduate School of Business Administration, Los Angeles, CA 90007.

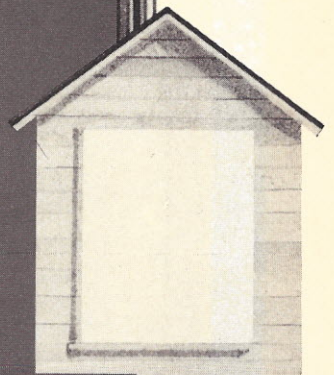
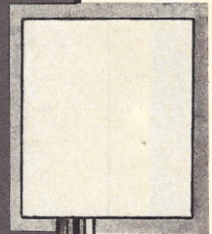
Telecommuting
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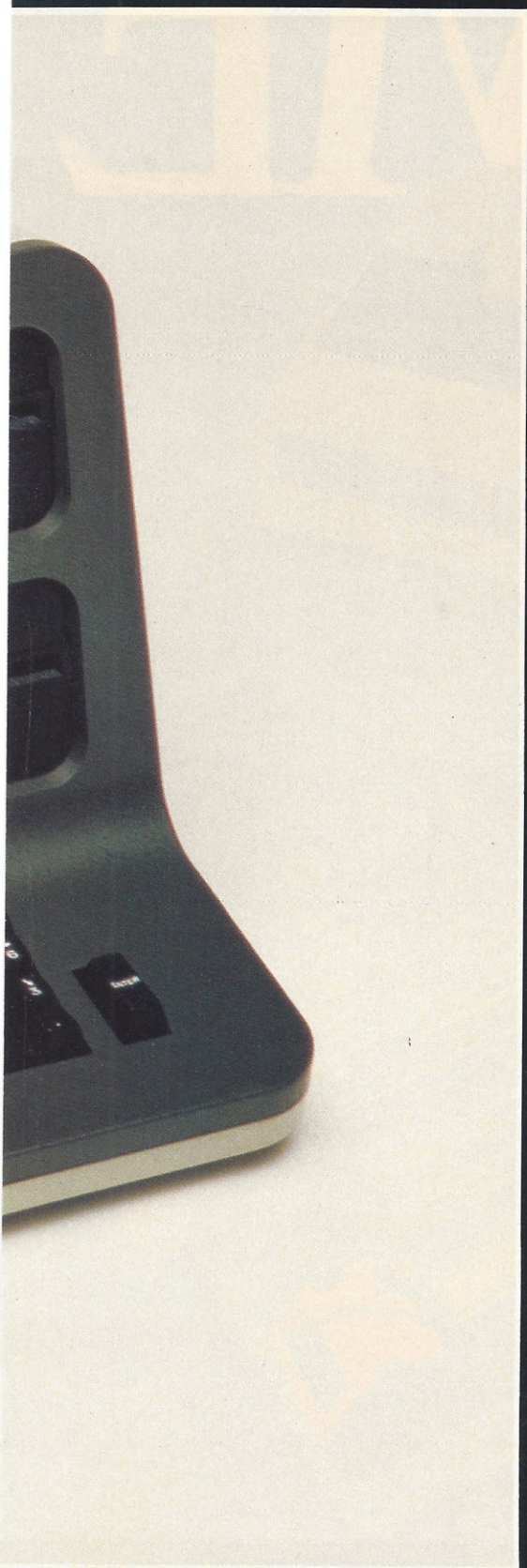
Moving Toward Implementation

Although the inherent portability of paper, the popularity of personal transportation and the abundance of imported oil will prevent immediate replacement with electronic substitutes just for the sake of change, enlightened industry leaders must anticipate new methods of doing business. Listed below are ten of today's essential considerations in planning for tomorrow. Keep in mind that the operational objectives of a particular system are largely contingent upon application environment and individual viewpoint. It is not uncommon for the user of a system and the system designer to have conflicting priorities.

1. Identify formal and informal communication parameters while developing a comprehensive understanding of *how* and *why* your office works the way it does. Computer system analysts and other consultants will be of little value until current operations—let alone objectives—can be conveyed clearly.
2. Work to refine existing practices so that wasteful habits are not merely amplified.
3. Record for future reference the most commonly used processes, procedures and techniques for the creation, distribution, storage and copy of documents. Identify shortcomings.
4. Assess the economic and productivity advantages of new technologies. A measure of feasibility lies in determining whether your firm's routine operations can be performed using existing hardware and software. Off-the-shelf technology is considerably less expensive than custom versions.
5. Consider the essential but seemingly insignificant costs of data transmission, equipment energy consumption and user training.
6. Evaluate the demographic implications of a proposed high-tech transition. By nature of the skills required of employees, the company might benefit from accessing a different labor market. Calculate the relative merits of real estate location vs. transmission expenses.
7. Measure the attributes of available carriers as they pertain to your organization. Acquire an understanding of public utilities vs. private networks. Keep abreast of breaking developments in fiber optics and other areas.
8. Determine the level of security necessary for your files. Obviously, insurance policies require a lesser degree of security than bank transactions.
9. Establish a corporate inventory of existing office systems and consider potential for interfacing. Prepare an outline of the optimum approach and methodology based on background information and cost comparisons.
10. Gradually integrate newer technologies such as electronic mail into your daily operations and plan for the purchase of more word processors.







North Star Advantage

by Roger H. Edelson

The North Star Horizon line of Z80-based, S-100 bus microcomputer systems has performed well in engineering, scientific and management applications. Perhaps their only real shortcoming has been the lack of graphics—particularly in the face of the stiff competition from some of the newer machines. With the introduction of the Advantage system, North Star has filled this void.

The new offering retains some of the heritage of the original Horizon line by virtue of its Z80A CPU architecture and retention of the 10 hard sector disk format. These characteristics keep the Advantage compatible with the Horizon format and most programs will not be rendered obsolete. In almost all cases, the older programs will not be able to avail themselves of the

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graphics capability of the Advantage, but will function as if a standard alpha-numeric terminal were in use. The programs that depend on specific characteristics of the terminal (i.e. X,Y positioning, clear screen, etc.) usually will not be transferable, and will need to be re-installed for the video-display characteristics of the Advantage.

The new offering differs from the previous North Star computer line in that it is no longer based on the S-100 bus board interconnect system. Leaving the S-100 bus architecture cuts Advantage owners off from the large number of accessory circuit boards available for this bus.

The newer machine has continued the functional integration trend of the Horizon models by combining a 4 MHz Z80A, a 64K-byte RAM, twin 5.55-in. double-density, double-sided floppy drives, a 12-in. display and a Selectric style keyboard. The unit is truly a desktop computer in that it occupies only an 18.75-in. by 20-in. by 12.5-in. footprint, which is not much larger than my typewriter, and weighs 43 pounds. The light weight is achieved by making the case from a high impact structural foam with a non-glare surface texture that is also compatible with the texture on the front of the disk drives. Hopefully, North Star will ultimately continue the non-glare texture on the keycaps, which will minimize the only source of operator fatigue that I encountered while using the computer. Additionally, North Star provides a Business Graphics package, and a complete system diagnostic program to make this almost a turnkey system.

The feature that really sets the Advantage apart from the previous models is its 12-in. green phosphor (P31) integrated display. This high precision display is supported by a separate 20K-byte 200 nS dynamic RAM, which allows the screen to operate either as a 1,920 character display (24 lines by 80 characters), or a 240-by-640 pixel bit-mapped graphics display. Actually, the Advantage provides a full 32K bytes of video RAM, but the additional 12K bytes has been reserved for future plans involving color displays. When in the alpha-numeric mode, the characters are formed by a 5-by-7 dot field, which can be positioned within the 8-by-10 pixel space. This allows the display of nicely formed characters with true lower case descenders. With this display, hi-res graphics and charts can be presented. These are well-supported by the supplied Business Graphics, G-DOS and G-Basic packages. Figures 1 and 2 present typical displays that are available. Figure 1 is pseudo-three dimensional chart; figure 2 is a complex torodial form. The Business Graphics package also allows user-friendly generation of line, bar and pie charts.

While North Star provides its own operating system and Basic language, most users will opt for the Graphics CP/M, which is a powerful superset of CP/M. This operating system is a compatible enhancement

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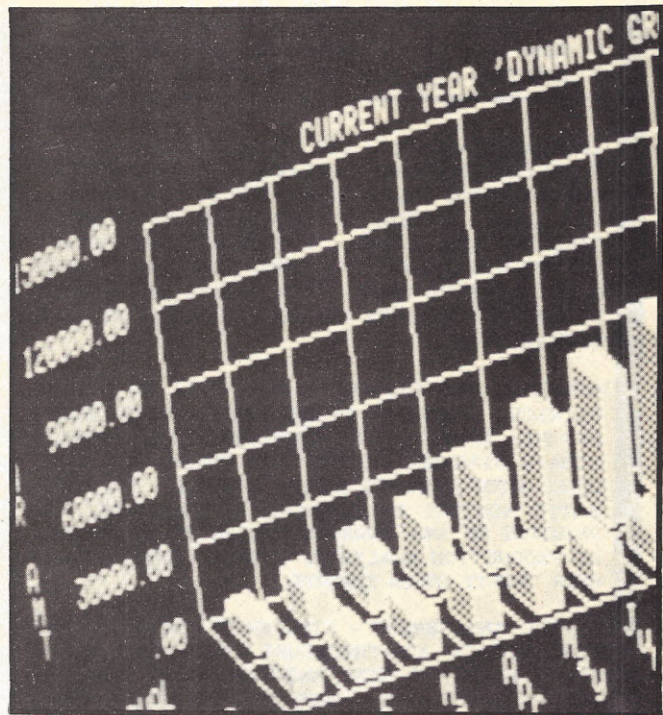


Figure 1. Three-dimensional chart

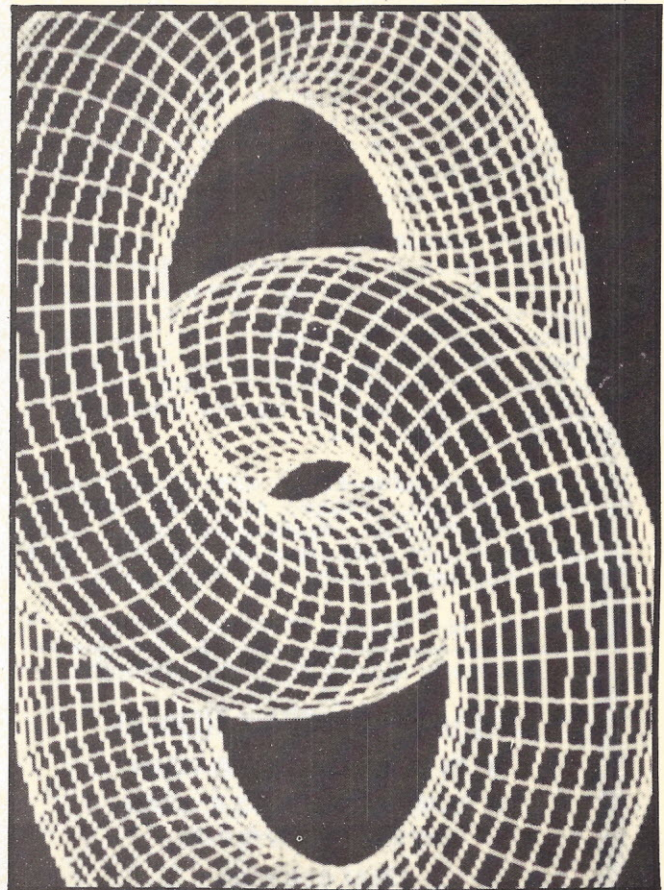


Figure 2. Complex three-dimensional forms

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of standard CP/M, the defacto 8-bit industry standard DOS. Under Graphics CP/M, the display is controlled in either the 24-by-80 alpha-numeric mode or the 240-by-640 graphics mode, which includes two sets of functions: geometric functions (POLYGON, ELLIPSE, etc.), and graphic support functions (CLEAR, BLOCK and CHAR), which are used to control the display operation.

The other feature that is apparent to the user is the 87-key, Selectric style keyboard. This is a non-detachable unit sculptured and contoured at an 18% angle to conform to the ergonomic principles currently in vogue. While North Star is quick to provide justification for the keyboard being non-detachable, this appears to be the only major mistake the designers made in this machine. Putting aside personal prejudice, the keyboard is otherwise well-designed, supporting an n-key rollover capability with good tactile feel and feedback. It provides 49 standard typewriter keys, nine symbol or control keys, a separate 14-key numeric/cursor control pad, and 15 user programmable function keys arrayed just below the screen. Another nice feature is the little LED placed in the shift-lock key to provide visual indication of the shift/unshift keyboard mode.

Both the separate pad and the function keys really come into their own when using the version of WordStar configured for the Advantage. In this application, the cursor control keys allow one-keystroke movement of the cursor within lines or fields—a real timesaver over the standard cntrl-E, cntrl-D, cntrl-R type of cursor command. The 15 function keys provide single keystroke commands of most of the more often used WordStar controls, again saving time and making the installation more friendly. Now, if only the keyboard were detachable...

In the standard configuration, the Advantage provides 64K bytes of dynamic memory with a single parity bit for error detection and notification. While I would have preferred single bit error correction, any error detect is better than nothing. To be fair, I have operated my Advantage for hundreds of hours, and have yet to notice a soft bit error. Actually, the Advantage uses a memory mapping scheme to expand the normal 64K addressing capability of the Z80A to 256K. One advantage of this 256K space allocation is that the disk boot PROM is located out of the normal 64K active RAM space so that useable memory is not reduced.

Mass memory for the baseline system is provided by two double-sided, double-density 5.25-in. floppy diskettes for a total of 720K bytes. The drives are the same as found in the Quad configuration of the earlier Horizon models. As mentioned, they retain full format/program compatibility. If you require more mass storage than the dual floppy configuration provides, North Star makes 5M-byte

hard disk available. This unit is also a 5.25-in. drive, using nonremovable media that can replace either of the two floppies. A 16M-byte unit will be available soon for users needing even more storage, and the prospects of even larger Winchesters are rumored. The Advantage designers provided for these options so that no system reconfiguration is required when upgrading to hard disks.

The Advantage is really a two-processor machine—the Z80A operating at 4 MHz handles all the normal processing, while an 8048 family microprocessor provides auxiliary processing for the keyboard and disk drive functions. The main PC board can accept either an 8035 microprocessor with external ROM or the 8048 device with internal ROM. The auxiliary processor provides the true

*The application that takes
the machine into full stride
is WordStar.*

n-key rollover capability by scanning the keyboard and assembling and storing generated characters in a 7-character buffer. The 8048/8035 also provides motor control for the disk drives and maintains a sector register for use by the disk drive controller. The Advantage does not use an integrated circuit disk drive controller, but instead relies on the Z80A for control and read/write functions, backed up by TTL MSI logic.

Six slots are available for additional printed circuit boards including a floating point board, a serial I/O and a parallel I/O. The floating point board allows up to 14 digits of precision and a typical 8-bit multiply time of 80 μ S. The serial I/O board allows communication with a standard RS-232C asynchronous/synchronous serial port at rates from 45 bauds to 19.2K bauds. While the SIO board does not support current-loop operation, but the option is provided by wiring a header to replace the 1488 output IC. The parallel I/O board is also relatively standard—using an 8-bit bus with three handshaking lines. Either a PIO or an SIO board must be purchased to allow operation with a printer. The operating system is sufficiently user-friendly, so that configuration of the BIOS for either choice is very easy, and when the plug-in board is in place,

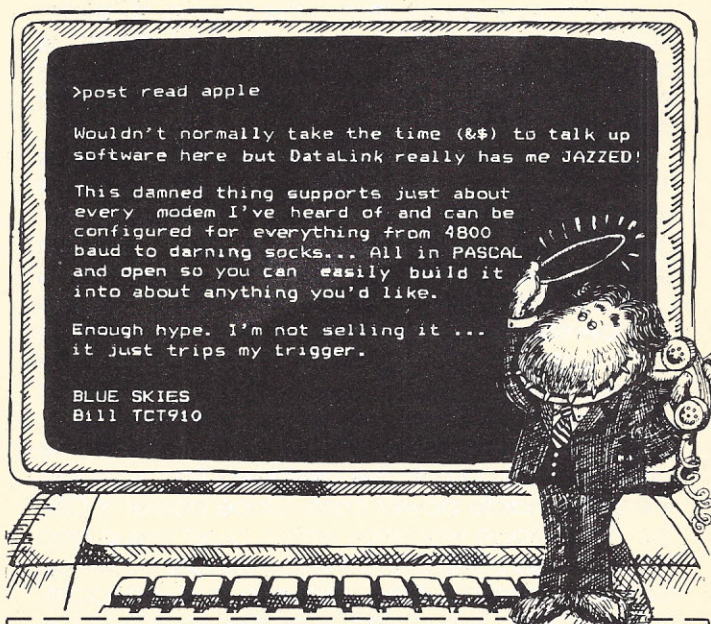
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Perhaps the most exciting option is the ability to purchase a low cost 8/16 board, which adds the Intel 8088 16-bit microprocessor and 64K bytes of dynamic memory. With this board in place, the Advantage uses the combined Z80A and 8088 devices with 256K of memory space available to the 8088. North Star will soon announce a large dynamic memory board. With the 8088, the Advantage will run the standard CP/M, Graphics CP/M, Graphics DOS and the emerging 16-bit operating system MS/DOS. Further, it will continue to read floppy disks written in the original 10-sector format, or in IBM PC format. The 8/16 board is available for less than \$500 and is compatible with either the dual floppy or the single floppy/single Winchester configurations.

Operating this machine is simple; one just plugs it in and turns on the power switch mounted just above the detachable power cord. These miserably-placed power switches are showing up on almost all new equipment. I know there are reasons for this placement (it makes it almost impossible to accidentally turn off computer power, crashing an important program, etc.) but I think it might be done to save a few bucks on UL approvals. The power switch on my old Imsai is right on the front panel and I have never accidentally turned it off. On the other hand, kudos to the designers for providing the detachable power cord. Once power is ON, the Advantage responds with a quiet beep and the message LOAD SYSTEM with a square cursor just below it appears. If the message is unreadable, or too bright, it is a simple matter to adjust the display brightness by rotating the large knob slightly visible on the upper rear of the case.

At this point, the operating system disk is chosen and inserted. Provision has been made to allow booting from either the upper drive (drive #1), the lower drive (drive #2), or a remote source such as a central computer in a timesharing or network system. When any program is loaded upon initial power-up, the Advantage automatically tests the CPU and the memory before proceeding. If the tests are satisfactory, either the program information or the operating system prompt will be displayed. That's it—from here on, you're on your own.

In the future, North Star plans to provide a local networking facility for the Advantage and Horizon called NorthNet. This will allow linking of computers over distances in excess of 10K-ft., with data rates of 1.5M bits. An advanced packet-switching and acknowledgement protocol will minimize the net accesses by requiring acknowledgement of a transmitted message before the originating system relinquishes the line. The interconnection will be by simple twisted pair cable. NorthNet will provide "gateway" devices to allow the net to communicate

with different types of processors and other communications networks.

NorthNet will be delivered with a minimal network operating system, allowing access to user stored programs and a simplified electronic, inter-computer mail service. I am particularly concerned about data file security in any network system—especially those connected to phone lines through modems. To some degree, NorthNet reduces these problems by using a dedicated line for interconnection in the baseline system, and a five level password security system in an effort to limit file

A networking facility called NorthNet is planned that will allow linking of computers in excess of 10K-ft. with data rates of 1.5M bits.

access to authorized users only. As an additional protection, the File Server card must be in place before resident files can be accessed from a network user, though you may still access other computer's files. Interestingly, once the File Server board is in place, the station must access its own files just as if it were displaced in the network. The networking will be complete with 16-ft. of cable and a tap for interconnection with the main network cable.

The North Star Advantage in its baseline configuration for \$3,500 represents a bargain in a full graphics capability computer, but available enhancements make this a truly formidable competitor amidst the next generation of small business machines.

Contributing editor Roger H. Edelson's experience in the electronics industry has included analog circuitry, analog computation, digital design and, most recently, design and development in the field of microwave communication circuitry. He has been with Hughes Aircraft for more than 20 years, during which time he has been Group Head of the Memory Circuits Group, and Senior Project Engineer with responsibility for the technical and financial development of the F-14 Computer Subsystem.

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| CP/M 86 | Yes | Yes | ? |
| MP/M 86 | Yes | — | ? |
| OASIS-16 | Yes | — | ? |
| XENIX | Soon | — | ? |
| OPTIONAL HARDWARE EXPANSION BOARD (Supported by Company) | | | |
| RS-232 Communications | Yes | Yes | ? |
| B/W and Color Display Controller | Yes | Yes | ? |
| Expansion Memory | Yes | Yes | ? |
| Z-80 CP/M-80 Board | Yes | — | ? |
| Cache Buffer Hard Disk | Yes | — | ? |
| Time/Calendar Board | Yes | — | ? |
| IEEE Bus Controller | Yes | — | ? |
| 8" Floppy Disk System | Yes | — | ? |
| 8" Hard Disk System | Up to 40 Mbytes | — | ? |
| Tape Cartridge System | Yes | — | ? |

¹For comparison purposes, typical professional configurations consist of 16-Bit 8088 Processor, 128K RAM with Parity, Dual 320K 5-inch Floppies, DMA and Interrupt Controller, Dual RS-232 Serial Ports, Centronics Parallel Port and Dumb Computer Terminal or Equivalent.

²Columbia Data Products also supports CP/M 80* with an optionally available Z-80 CP/M Expansion Board.

*As advertised in BYTE Magazine, August 1982.

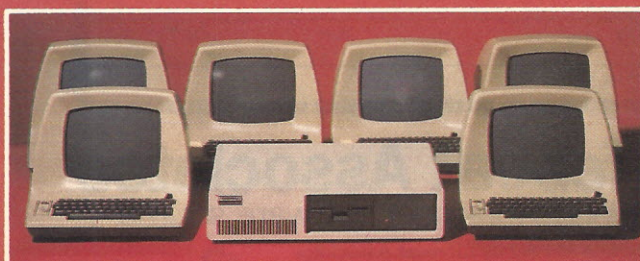
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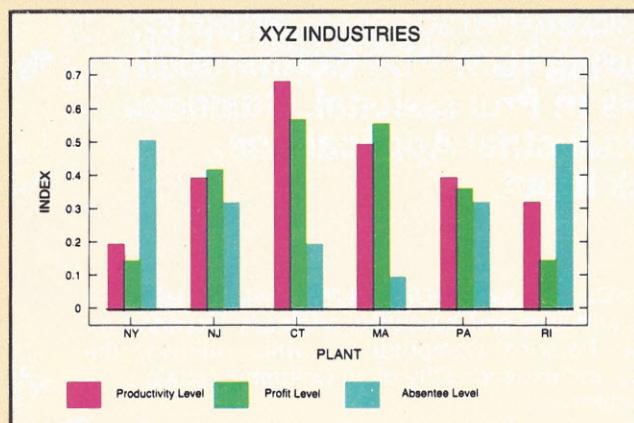
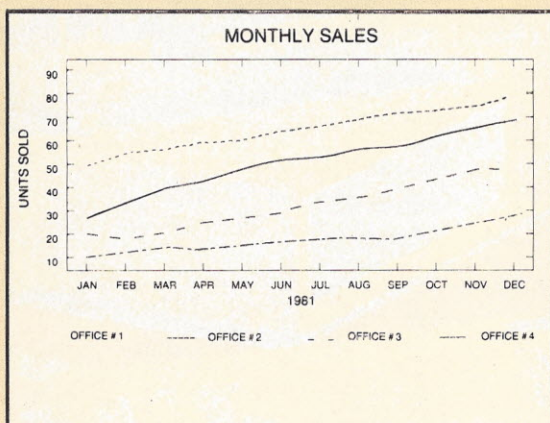
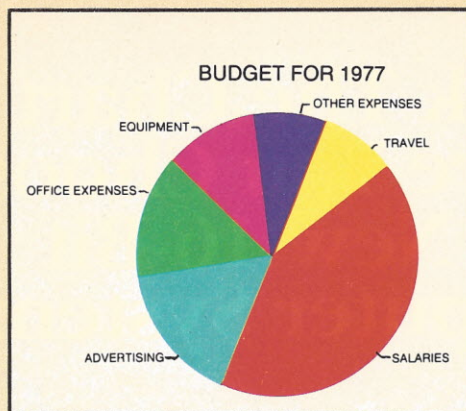
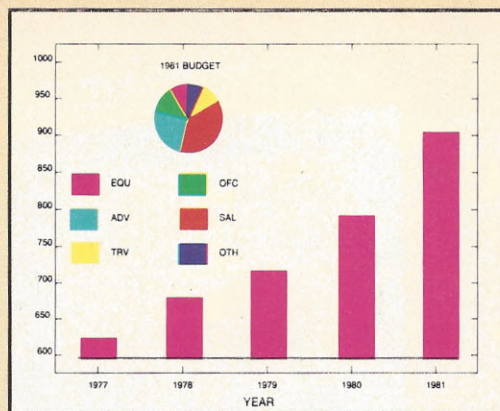
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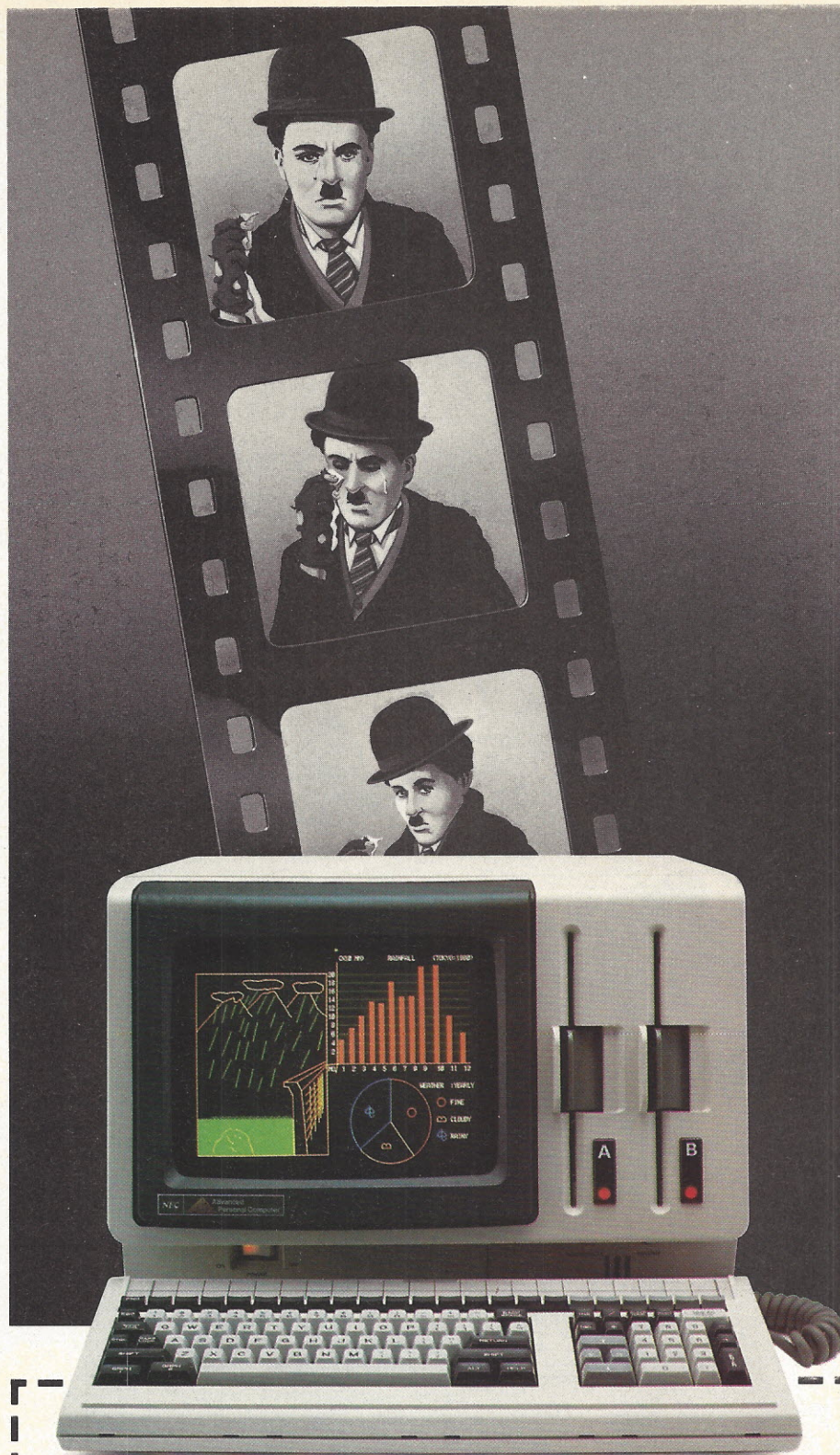
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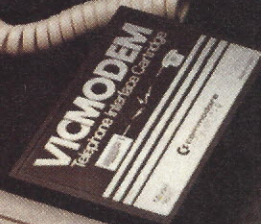
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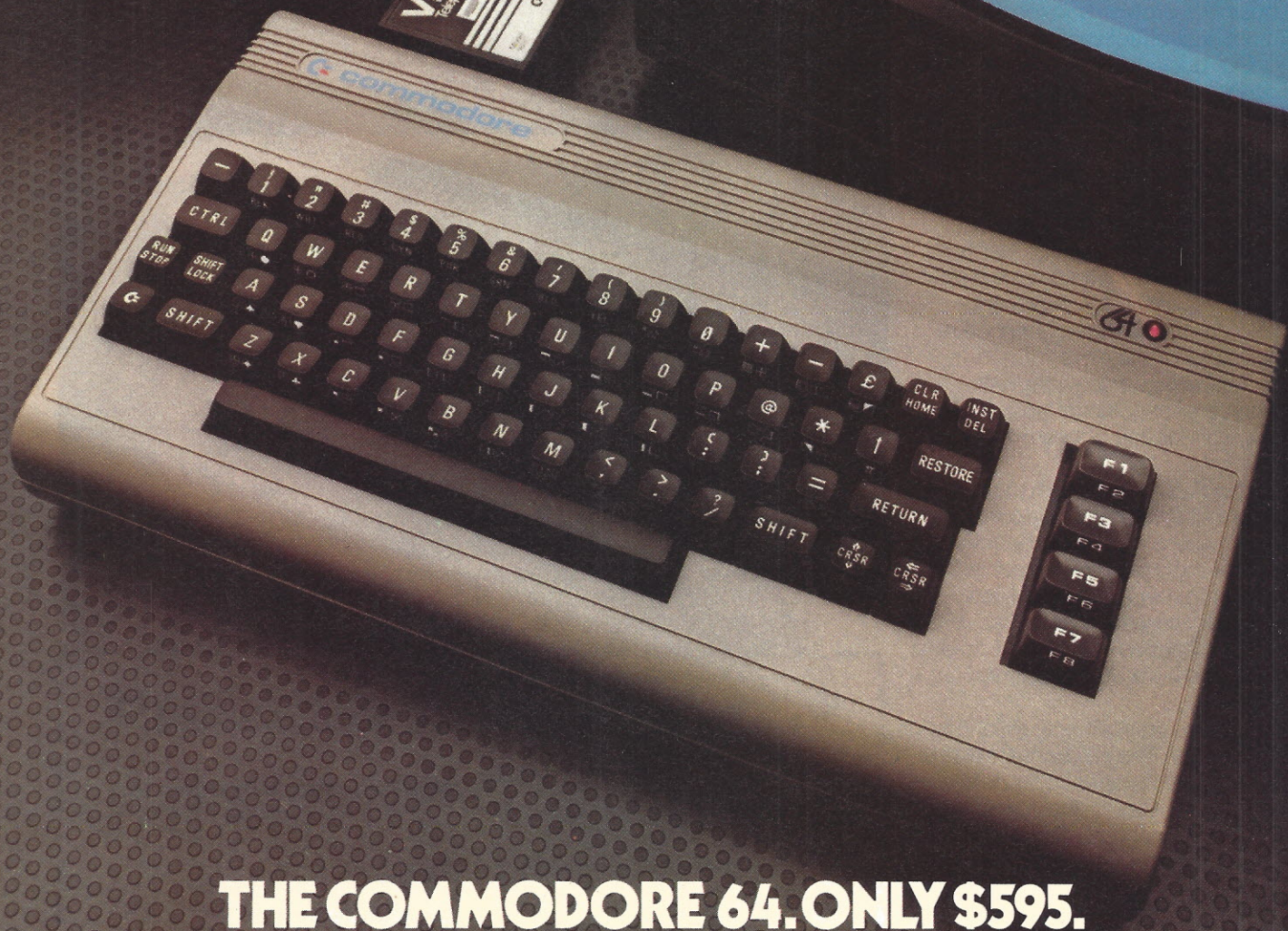
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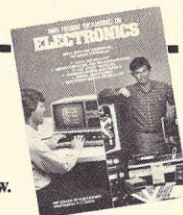


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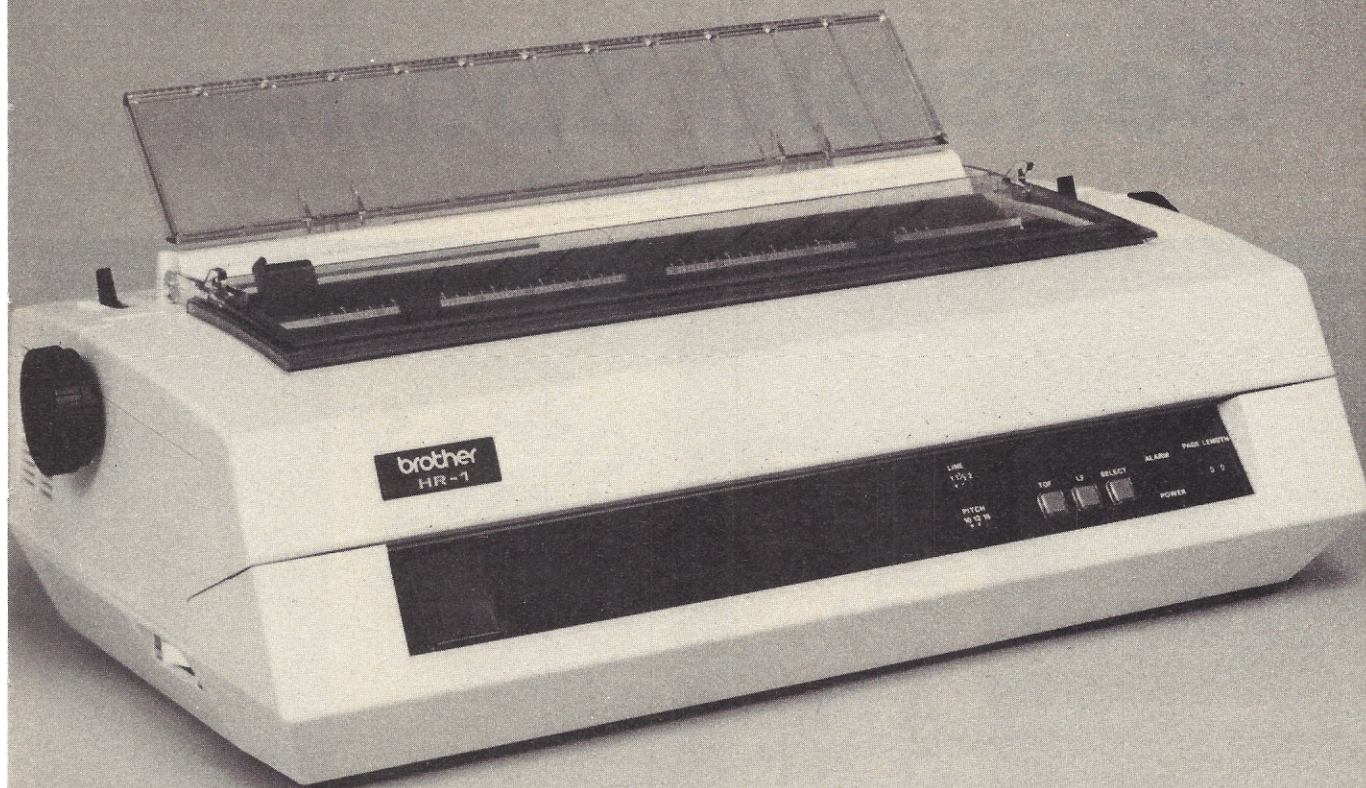
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Sensible Speller

by Robert Moskowitz



Sensible Speller is an updated version of Apple Speller by Sensible Software (W. Bloomfield, MI), which was similar in many respects. That product had to be withdrawn from the market, according to Sensible's Sales Director, Roger Tuttleman, because of contractual problems. It's no loss to the world, though, because this new version does everything the old program did—and more. It's fast, easy to use, self-prompting, comprehensive (with one exception), and a very useful word processing utility.

To capture more of the market, the company provides this program in five versions, one each for DOS 3.3, 3.2, SuperText's special DOS, CP/M and

Pascal. The DOS 3.3 version was used for this review. Only the program disks are configured differently; the dictionary disks are the same for all versions. Sensible Speller can service the files of a great many word processor programs, including . . . most of the popular software offerings designed for the Apple.

The package, priced at \$125, is neatly contained in a 2-in. thick binder that holds the two identical program disks, two different dictionary disks, some 50 pages of instructions and tips for the user, plus a printed copy of the *Random House Dictionary* (concise edition). This is the source of the more than 74,000 words on the dictionary disks as delivered.

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To use the program, you simply boot a program disk. Most of the time, this puts you into the program. But the smart disk does some Apple diagnostics and will balk if you have installed any special chips, like the SuperChip, in the F8 socket of your Apple II. The program won't run unless this socket contains the standard Apple II or II+ monitor ROM.

Assuming your chips are all right, Sensible Speller launches into the first of its super-fast sequences of defaulted questions. These sequences help you set up the program for different applications with a minimum of time, trouble or thought. The initial sequence of set-up questions includes: Single Drive Mode? Default = N; AppleWriter 1.0/1.1 Mode? Default = N; Accept International Characters in Words? Default = N; Proofread a Document? Default = Y. This means that hitting <Return> four times sets you up for 99% of your proofreading in less than 1 second. If you want to exercise one of these options, merely hit "Y" instead of <Return> at the appropriate time.

"Y" to the Single Drive question allows you to use Sensible Speller with only one drive by switching disks when prompted. Unfortunately, you cannot

rewrite the dictionary disks with single drive systems, and so cannot add or delete words to create any customized dictionaries.

"Y" to the AppleWriter question prepares the program to handle these earlier versions' special binary document files. AppleWriter 2.0, however, creates files Sensible Speller can handle without any special considerations.

"Y" to the International Characters question sets up the program to recognize 10 special characters in addition to the full set of ASCII letters and numbers we normally use. For most English-speaking users, the correct answer here is "N".

You need only answer these questions once per session. They hold until you quit the program. The remaining parameters can be changed between documents, if desired.

"Y" to the Proofreading question brings you into the main part of the program. At this point, Sensible Speller prompts two-drive users to replace the program disk with a document disk, and insert a dictionary disk in drive 2. It then catalogs your documents and, a la VisiCalc, displays each file name in turn to see if it is the one to be proofread. If "N", it displays the next file name. If "Y", it goes to work. Single drive users insert their document disks, then later change to the dictionary disk at program prompts.

Another super-fast sequence of set-up questions is the lead in to the proofreading process. You are asked if you want the program later to display or print various word lists, including all words: a) found in the document, b) found in the document but not on the dictionary disks, c) chosen to be marked as misspelled in the document, d) chosen to be added to/deleted from the dictionary disk.

Another set-up sequence asks you if you want the unknown words marked at the end of the session. Default is "Y", because an "N" to this prompt aborts the proofreading and shunts you to the dictionary maintenance sequence. If you want the words marked, the set-up sequence continues by asking if you want to verify the unknown words before marking them. The earlier version had a pre-programmed character (Λ) for marking words, but the new adaptation lets you use any convenient character as the marker. It will automatically replace the last letter of the words you say are misspelled with this marker character. The idea is to make finding the words and correcting them much easier.

This set-up sequence also assumes you want to ignore any imbedded "." commands. But this default can be overridden and any two characters designated so the program will automatically accept and ignore any strings in a document that *begin* with these characters. The set-up sequence is also defaulted so the program accepts and

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ignores strings that begin with control-characters—the typical format for many printer control commands.

Finally, you can select output to the printer (non-zero slot number) with or without sending linefeeds, or to the display (slot 0). Key in an empty slot by mistake, though, and the program will eventually hang. Strangely enough, paddle 0 is used to control listing speed. If no paddle is plugged in, the listing goes by at a very fast clip. If you want it slower, you must turn the paddle control counter-clockwise. If you go far enough, you can slow the listing to a crawl. In any case, the space bar will stop and start the listing so you can examine it more closely.

The first stage of actual proofreading is to collect all the words in the document. During this stage, the display shows the continually updated number of words and unique words so far collected. For example, if your document consists of "Now is the time is now," Sensible Speller would finish proofreading with six total words and four unique words on the display. When the collection is complete, the program will give you the list of all words if you've asked for it, before moving on.

Next, the program begins to compare the collected words against the words in the on-line dictionary disk. The rate is about 1,000 or 1,500 words at each pass. The 45,000 word main dictionary is read in under 1 minute. As the program works, the display shows the continually updated number of words in the dictionary that have been read so far.

When one dictionary disk is complete, you have the option to insert and compare the remaining unknown words against other dictionary disks. Sensible has supposedly arranged the two disks it supplies with the program so the most frequently used words are on the main disk, and the less frequently used words on the supplementary disk. There is no mention made of the basis used for this determination. But you can judge for yourself: on this article, for example, the program found 35 words unknown after running the main dictionary, and 27 words still unknown after using the supplementary disk.

No spelling program yet devised can fix outright omissions of words or mistaken use of plural or singular forms, nor can they tell if "your" using the "write" word in a sentence. Sensible Speller, as expected, did not identify those two errors, although it did find this last "mistake."

Once the dictionaries have been checked, Sensible Speller will list the remaining unknown words for you—if previously requested. The program will mark all these unknown words in the text file automatically. But one of its neatest features is the option to verify each of the unknown words on manual.

Most people have a lot of qualms about letting

any computer tear into their text on auto-pilot. If you choose to verify each word, the program shuffles the entire text file at lightning speed through three lines of text it sets up at the bottom of the display. It's actually fun to watch, and the document word counter gives you a constant check on how much of the file has been covered. This shuffling pauses only to show you the unknown word in *inverse*, surrounded by a sentence or two of the preceding and following text. As it pauses, Sensible Speller prompts you for a command.

"I" tells the program to ignore that word in the rest of the document—in effect, to accept it as properly spelled. "A" adds the word to a list that Sensible Speller will later include on a re-written dictionary disk. "M" causes the last letter of the

*This new version
does everything
the old program did
—and more.*

word to be replaced by the marker character you designated earlier. And "L" accesses the dictionary disk and allows you to search with wild-card characters for the word you really meant to spell.

In my experience—and I have always been a good speller—most of the words that Sensible Speller finds for me are proper names and acronyms. I check them by sight for spelling, but basically am wasting my time going over these words. Fortunately, there are usually only a few. However, the program pays for itself—in my mind—by catching all the embarrassing typos that otherwise might get through—"hte", "canb", "footbal"—and so forth. I could proofread a document ten times carefully and glide over these at every pass. The computer never misses, and I therefore feel more confident of finished textual output.

Once all the unknown words are processed in this fashion, you have a checked and (possibly) marked document file that's easy to correct, if necessary. Now the program is read to rework the dictionary itself. Single drive systems do not support this part of the program.

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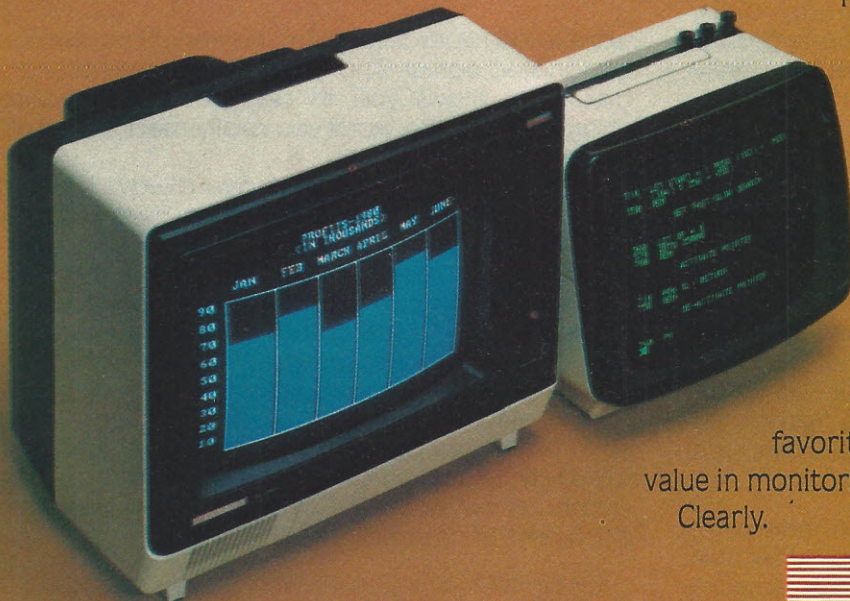
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If you decide to Add or Delete any of the unknown words, the program prompts for insertion of a blank disk in drive 1. In the Add sequence, you have another chance to verify the words you have selected for the dictionary. When you are sure you want to proceed, the program prints or displays a list of words to be added. It then initializes the blank disk and copies the dictionary disk—with the specified additions—onto it. The previous dictionary is left unchanged.

There is also a "global" mode to this part of the program. First, you create a text file containing only the words you wish to add to/ delete from the dictionary. Next, you process this file through Sensible Speller, but answer "N" to the Mark Misspelled Words prompt. Sensible Software will re-write the dictionary and either Add (without creating duplications) or Delete all the words in the file.

If you respond "N" to that early Proofreading prompt, you enter another sequence of command options. Here you can: 1) display all or any portion of the words in the dictionary; 2) count the number of words in the dictionary and the free sectors

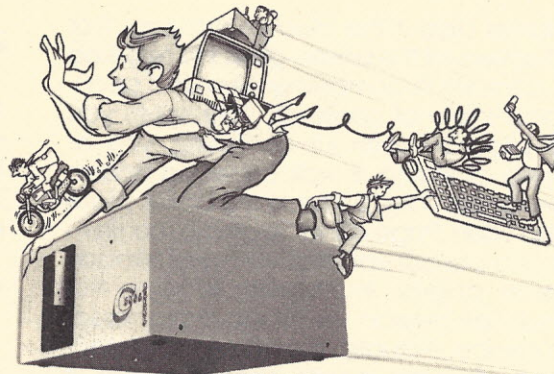
remaining on the disk; or 3) create a new dictionary disk containing no words. As a practical matter, the first two options are most useful on the dictionaries created with option 3.

You can use the program for other applications than proofreading...

These options allow you to create totally customized dictionaries that contain only the desired words. For most applications, the general dictionaries are probably preferable. A custom dictionary could be used as a supplementary disk to allow you to proofread specialized documents more easily. A

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small vocabulary of specialized words can simply be added to the general word disk. More than 1,000 or so such words will probably deserve a special disk of their own. If I had need for such a vocabulary, I'd probably start a blank dictionary disk, then add all my unknown words to it, instead of to the general dictionary.

You can use the program for applications other than proofreading, too. For example, it willingly prints a list of every word in your document and specifies the number of times each one appeared. You can study such lists from many different documents over a period of time to determine your writing style and usage habits. The program also counts the words in a file. If your word processor, like mine, doesn't have this feature, you can use it for this even without going through the proofreading process.

Writers of children's stories or grade-level text books will appreciate the value of the program when used with limited dictionaries. You can key in each grade-level word list to a special blank dictionary disk, then run your writing against the appropriate ones. The program will tell you in a minute if you have used words too difficult for youngsters.

No complaints about the documentation. Not glamorous, it covers all the bases, gives the required information, contains a comprehensive and accurate index *and* table of contents, and takes you through the program without confusing you or over-simplifying anything. It was done, no doubt, on a word processor, and some of the boiler plate was boiled too often. Page 40, for example, contains a dual dose of a paragraph that we have already read on earlier pages. A program to solve this problem would be reason for all word processor operators to rejoice. Actually, the program is totally self-prompting, so you could probably run it perfectly well without even opening the book.

This is a program with only minor flaws. One is the decision to control the program's listing speed with Paddle 0. I don't use the paddles very often, and they are generally not plugged in. This means my listings go zipping by and I can only stop and start them to see what they contain. Imagine if the speed of your car was controlled by the cigarette lighter. Listing speed should be set by the numbers on the keyboard or some other input that does not unplug.

The program does not respond well to control characters imbedded in text. It ignores the control character itself and treats the text on both sides of it as two parts of a single word. Since my word processor uses a Control-P to start paragraphs, Sensible Speller thinks the last word of one paragraph and the first word of the next go together.

They're invariably "unknown," as well. It displays them, and I hit "I" for Ignore. Occasionally, I would have liked to Add one of those words to the dictionary. I don't dare, however, because it would add the whole sequence, not just the word I want.

Also, words longer than 31 letters—they don't show up too often—are truncated. That's probably the worst way to handle them. I would prefer to have them automatically marked for manual verification.

And that's another problem: I have to reload my word processor to do the fixing that Sensible Speller

The program is totally self-prompting... you could probably run it without even opening the manual.

found was necessary. If the Sensible Speller can read a file, and replace a letter in a word, it should have the facility to fix the spelling immediately. During the Verify sequence, for example, you could easily key in the correct spelling of the displayed "unknown" word and Sensible Speller ought to replace the whole word and be done with it.

One final item: the program runs out of memory when a document has more than 2K bytes of unique words. Since I like long text files, this may eventually turn out to be a limitation. But frankly I have not hit that limit yet.

People who do a lot of word processing and insist on accurate output will find this program a worthwhile investment and a beneficial addition to their everyday set of writing tools.

Contributing editor Robert Moskowitz is a full-time management consultant and business writer. He has authored management programs and produced industrial training films. He wrote How to Organize your Work and Your Life (Doubleday) and has contributed to numerous publications. He is currently Editor-in-Chief of Executive Productivity and Office Technology Management and recently developed the computerized Personal Productivity Audit system.

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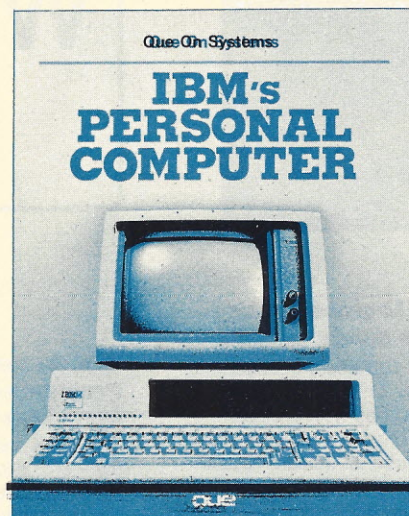
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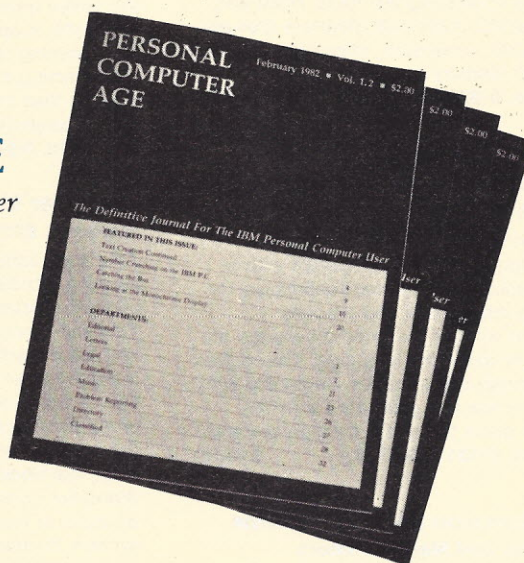
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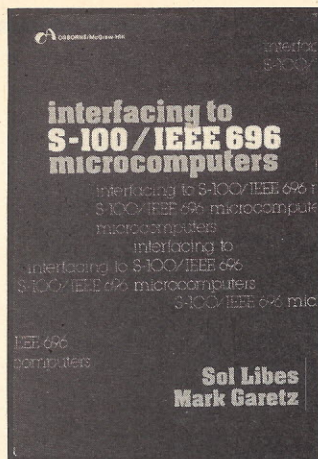
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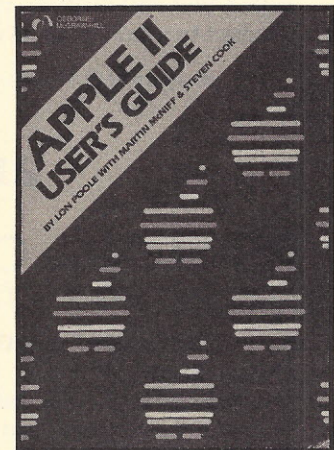
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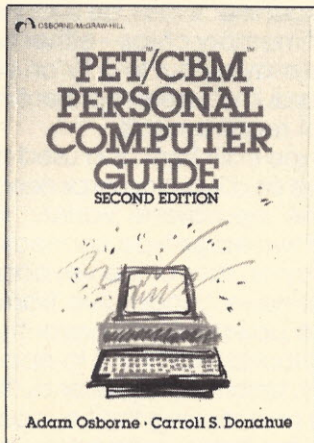
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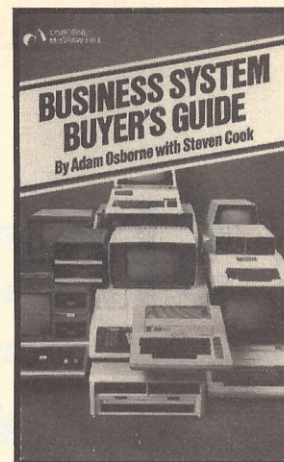
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CIRCLE 91 ON INQUIRY CARD

Sinclair ZX81

by John C. Nash and
Mary M. Nash

A refurbished Sinclair ZX81 version—the Timex Sinclair 1000—is now being distributed throughout North America. Timex Corp. (Waterbury, CT) has licensed exclusive rights from Sinclair Research (Boston, MA) to market the revised unit.

We are offering the following article for the thousands of owners or prospective owners of the original Sinclair unit. In an upcoming issue, we plan a review article on the enhanced Timex Sinclair 1000.

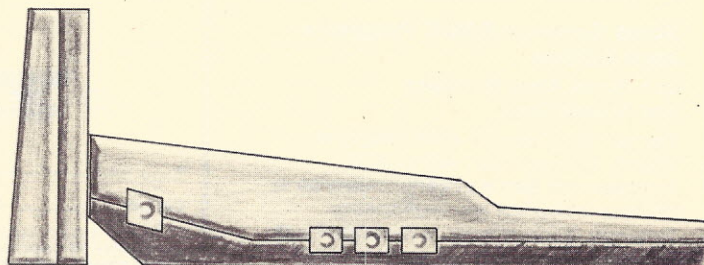
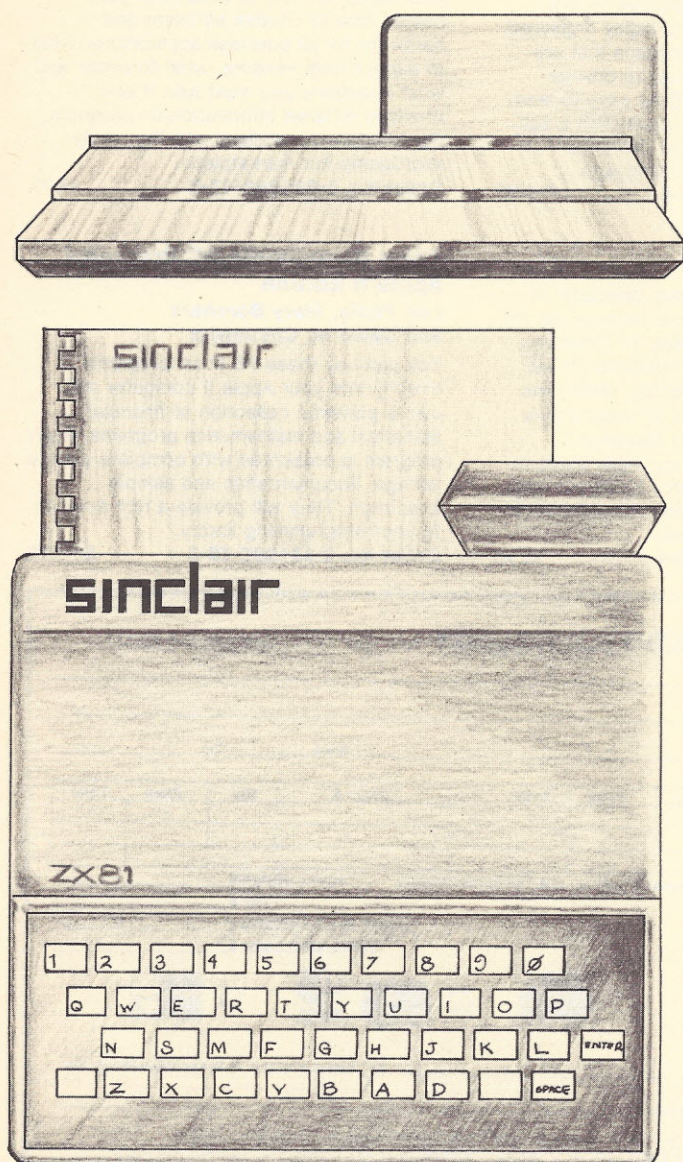
—ed.

The Sinclair ZX81 is reported to be the world's most popular computer. It has been produced at a rate of 50,000 units per month since mid-1981. Any machine so prolific clearly deserves a closer look. This affordable microcomputer has been available in preassembled or kit form. There are several versions of the machine. It may be supplied with two different sets of memory chips—either two 2114s or one 4118—and may output to a TV on various channels using several line/screen conventions depending on national requirements.

We ordered our machine in kit form and used the actual construction phase as a learning experience.

The keyboard is of the membrane variety. It is connected by means of two edge-type connectors into which the plastic (mylar) tails of the keyboard are pushed. These tails have conductive traces. We connected a TV and powered up uneventfully (with a sigh of relief) and found everything to apparently be working correctly. Unfortunately, after putting the board in the casing and sticking the keyboard to the casing, several of the "keys" refused to work. We then opened the casing, disconnected the keyboard and very carefully re-seated the tails in their socket. This corrected the fault—and we have had no further problems with hardware.

Mention should be made of the power supply for the ZX81. Instructions say a 9V DC power supply is best, but the amperage rating is important. We bought the 16K-byte RAM pack as an add-on. This extra memory will increase the power requirement. The manual specifies 700 mA at 9V. The assembly instructions require 8-12V at 600 mA (1.2A if the printer is attached). A colleague who bought the ZX81 by mail order in the U.S. received a 9.75V



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power supply rated at 650 mA. In the U.S., a power supply is included in the purchase price of both the ZX81 kit and assembled version. In Canada, one must pay \$19.95 extra for the power supply.

We found the ZX81 to work quite well with a 5-in. solid state black and white portable TV/radio. This version seems to produce channel 39 in the UHF band. We had to adjust the vertical and horizontal hold, contrast and brightness slightly from the settings used for watching TV broadcasts. The Game-TV switch box supplied with the ZX81 is only marginally useful. We also tried an older tube-type black and white 12-in. portable TV and a solid state color 12-in. portable TV without success. The black and white TV had been used for some time with a Pixie-verter as the output screen from a Jade VB-1B in a North Star Horizon computer. With the ZX81, both unsuccessful TV's showed so much flicker, image-shaking and lack of horizontal hold that we had to abandon them before getting motion sickness.

The cassette port on the ZX81 worked well—the most reliable we have encountered. After minimal adjustment, we found an appropriate set of volume/tone settings for two different cassette recorders. The ZX81 cassette port does not seem to need excessively high volume levels. We tested it with large programs (about 150 lines) and found it satisfactory. When the cassette is recording or playing, the signal is also sent to the screen, yielding a striped pattern. The only data we have lost appears to be due to an imperfectly-seated "record" jack. We are now very careful to make sure these are "home" before saving or loading programs.

RAM supplement is offered

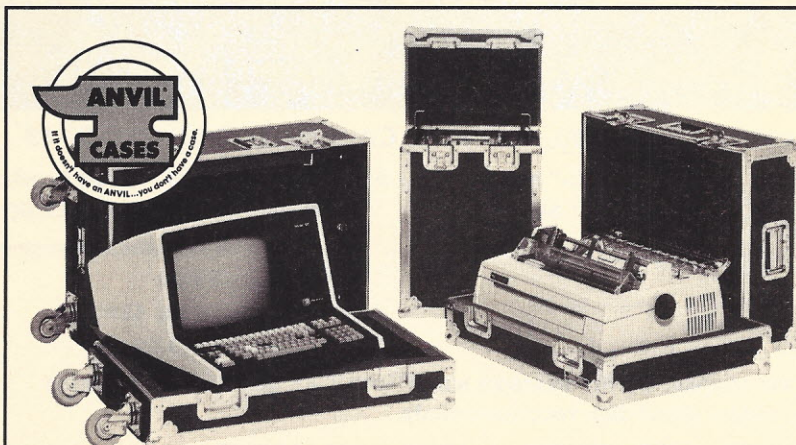
The 16K RAM pack has an edge connector that attaches to one corner of the main circuit board. It is actually a 15K-byte supplement to the on-board 1K and allows the ZX81 to tackle programs other

than trivial ones. The RAM pack does not seem too securely connected, particularly as the casing on our ZX81 is not perfectly flat and wobbles unless we lay it on a pad.

How could the hardware of the ZX81 be improved? Here are a few suggestions. A power-on LED would be useful. It is difficult to know if there is power present, particularly when trying to tune in the TV. Some screws should be provided to hold the RAM pack firmly in place. A key click would allow the user to know a keystroke has been registered as the membrane contacts respond to a very light touch. A direct video output for those with monitors or instructions for such a modification would also be valuable. Regulated 5V power input or modifications for this should be available. The voltage regulator and heat sink get quite hot in use. We tried using a 6V battery as a power source, but its voltage was too low to drive the system. A more rigid "tail" for the keyboard to facilitate the connection should be employed.

The ZX81 runs its own dialect of Basic, but is relatively easy to program. Perhaps the most difficult part of the job is figuring out how to enter program lines. The keyboard is very busy—keys have up to five functions. For example, the W key has OR, UNPLOT, COS and a special symbol for graphics. These functions are context-dependent. If one is at the start of a line, the cursor is an inverse video K (white character on a black background instead of the usual black-on-white). The K in this case means "keyword" and touching any key then gives its keyword equivalent.

Some examples are: P=PRINT, I=INPUT, L=LET, F=FOR. Numbers retain their literal identity in this mode. Other inverse video keys are L for input, F for function and G for graphics. After a keyword has been entered, the machine automatically changes to input mode. In this mode, the keys have their normal function. At this point, suppose we have entered



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where the F0R has been created by a single touch of the "F" key. We could now enter the following keystrokes.

1
=
1
space
T
0
space
9

The command "EDIT", shifted 1 (one), is very useful in clearing the screen of garbage resulting from unintended keystrokes. When a program is present in memory, it can be used to alter lines. The keyboard is too small for touch typing. Since the Z80 microprocessor is handling all the Input/Output, the screen and computations, one can easily exceed the rate at which keystrokes can be entered. In this regard, tokenizing saves time once the user is accustomed to it.

From a naive-user point of view, the ZX81 is a superb learning tool. The manual is, by and large, well-written. In its 179 pages and 28 chapters are

a step-by-step guide to both the ZX81 and Basic. There is an index to all topics, keys and how to obtain them and three appendices covering the ZX80 character set, report codes and the idiosyncrasies of the particular version of Basic used. Nevertheless, we have discovered some oversights and small errors in the manual that may cause beginners annoyance. One source of confusion was the syntax error mechanism at the end of Chapter 2. This needed some practice before it was fully understood. It would have been useful at this point in the manual to have had some indication of how to get rid of the garbage that resulted during this exercise.

The author of the manual spends considerable time describing how to turn on the machine, but nowhere is it described how to turn it off or the best sequence for doing so. Some errors were noted in the exercises at the end of the chapters. Exercise 1 in Chapter 5 refers to antilogs in another chapter—the reference is wrong and the correct reference is probably Chapter 4, Exercise 4. The expression to be entered in Chapter 7, exercise 2, results in a syntax error halfway through. The correct expression to be entered is:

```
PRINT "X";";";"X", \\\nPRINT "X";";";"X", \\\n
```

In this case and others, it would be helpful to have some idea of what the results should look like or what the answer should be. This is done in some cases but should be done for all exercises. Predictably, some users will find the British references (pounds, shillings and pence) quite odd.

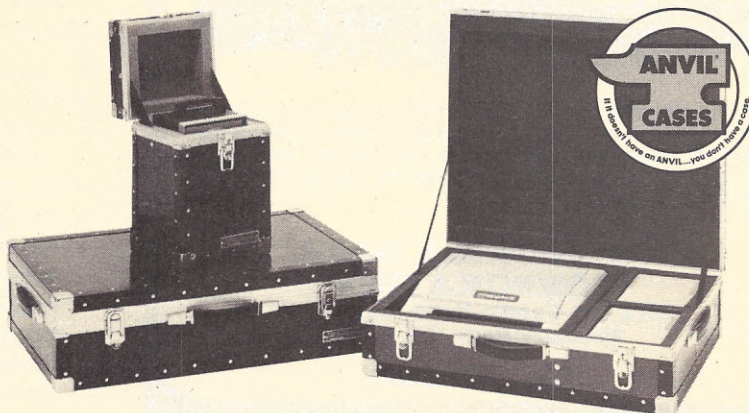
The ZX81 is somewhat unusual in its set of capabilities when compared to many other machines currently available. It can, with the 16K RAM, hold quite large programs with reasonable space to spare for data. However, it is not equipped with a mechanism for determining just how much of that space is left at any moment—there is no SIZE, FREE or MEMORy function. Since it is possible to create

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user machine code programs and run them via the USSR command, it is probable that such a capability could be programmed by experienced users. When the ZX81 runs out of space to store program lines, it starts to delete things from the screen memory, so some strange things happen on the display as the program becomes "too big." For example, attempts to use too much space when a program is executing by trying to dimension an array too large will cause an error code to be displayed and execution to halt. The error or report codes are quite cryptic (there are only 16 possibilities). This is a potential source of frustration to newcomers.

The ZX81 Basic is rich in features. It offers a solid floating-point arithmetic implementation: the mantissa (significant digit part) of each floating-point number is a full 4 bytes or 32 bits. Binary arithmetic is used, so the maximum exponent range is 255. In fact, one can easily determine that the largest exponent is 126 (that is, the number multiplying a particular mantissa can be at most 2^{126} or approximately $8E+37$). The smallest exponent is -128 , so numbers with this exponent have their mantissa multiplied by 2^{-128} or approximately $3E-39$. The ZX81 appears to round up. For example,

$2^{**}(-65) * 2^{**}(-64)$

gives the same result as

$2^{**}(-64) * 2^{**}(-64)$

That is, $2.938759E-39$. However, $2^{**}(-129)$ gives zero.

The ZX81 is highly interpretive. Responses to INPUT statements can be any valid expression and can involve functions such as SIN, LN or ** (raising to a power). Because of this, perhaps, the interpreter allows INPUT to accept only a single number. Furthermore, one is not allowed to have a prompt. That is, the instruction

100 INPUT "THE NUMBER IS"; X

must be replaced by

100 PRINT "THE NUMBER IS ";

105 INPUT X

110 PRINT X

Similarly, extensions and restrictions are found elsewhere in ZX81 Basic for example:

- only one DIM per statement
- LET must always be used in assignments
- multi-letter variable names but single letter names for arrays, strings or for the control variable of a FOR loop
- string arrays and unconventional string handling
- GOTO as a command rather than a program statement
- no DATA, READ or RESTORE; but arrays and strings, once created, can be SAVED on tape—even if the program lines that created them have been deleted
- no mechanism appears to exist for saving data

- on tape except as part of a program
- use of a unique character set with tokens. This will inhibit interconnection with ASCII devices.
- graphics characters and plotting
- recursive subroutine calls
- no ON statement but GOTO expression is allowed, as is GOSUB expression
- no multi-line delete

The computational speed of the ZX81 is pleasing. In FAST mode, it ran the following program in 14.6 seconds (i.e. each transcendental function took less than 50 mS on average).

```
10 FOR I= 1 to 100
20 LET X= EXP(SIN(COS(1 )))
30 NEXT I
40 STOP
```

In SLOW mode, calculations take about four times as long, and the ZX81 seems to reformat the screen for each new number, which further extends the elapsed time.

The Sinclair ZX81 is a small, inexpensive, comparatively powerful calculating engine. Its speed, numerical precision and function set make it a good tool for trying out numerical algorithms. Flexible string handling also allows it to be used to test certain non-numeric programs, but lack of tape storage facilities for data is a hindrance. Despite very small size, its power demand and need for a television and a cassette recorder mean it is not a truly portable computer. The confining keyboard will annoy some users—especially those who touch-type.

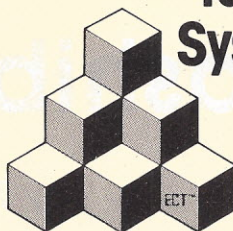
In the realm of teaching elementary computer programming, the ZX81 is clearly a winner. This appears to have been a main design criterion for its makers—and they earn high marks for catering to this market. The price of the ZX81 makes it cheaper than most computer programming courses—and you get to keep the computer. □

Dr. John C. Nash is the author of many works on the applications of small computers, including a book on compact numerical methods. He consults in computation and mathematics and teaches statistics and forecasting at the University of Ottawa, Canada.

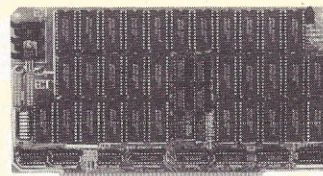
Mary M. Nash has a B.Sc. in Chemistry from the University of Calgary and library qualifications from the University of Alberta and the University of Wales. She is currently a consultant and writer in the field of information science, specializing in new information technologies and applications.

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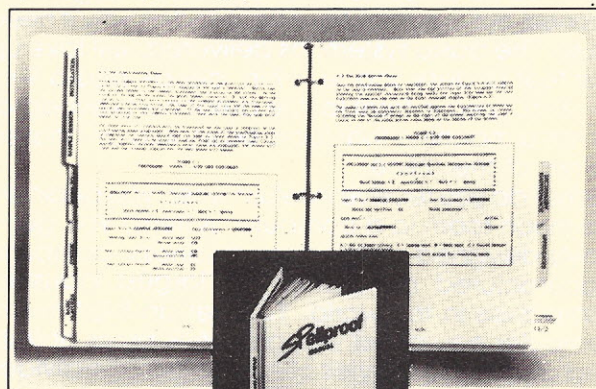
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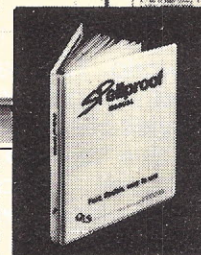
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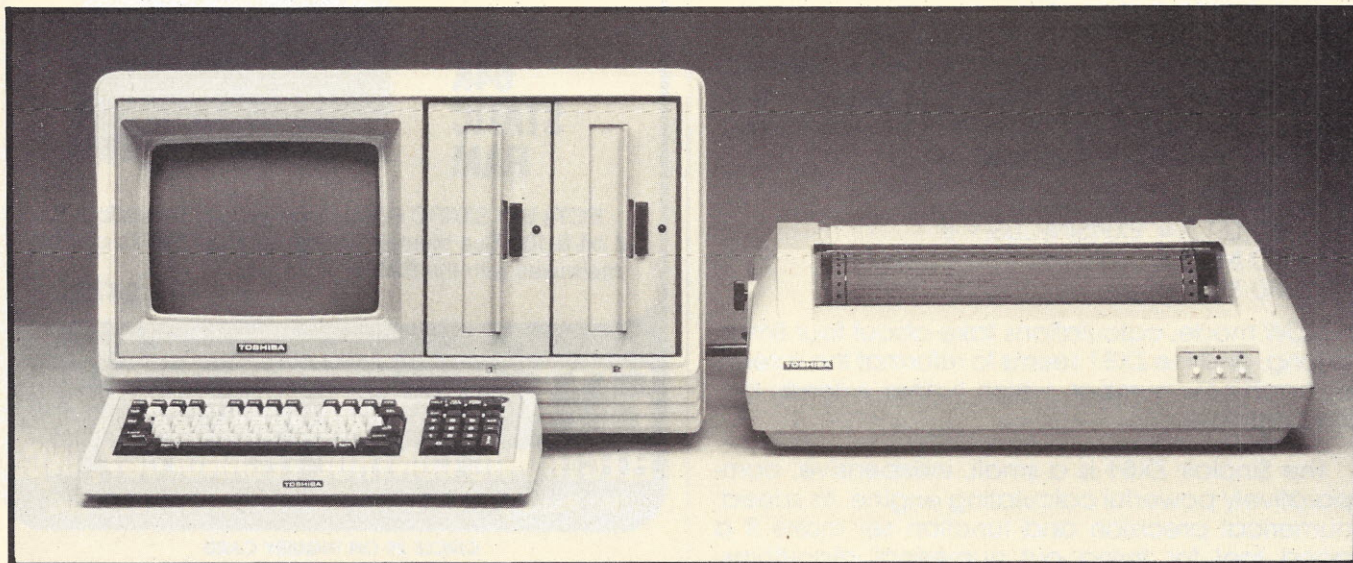
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Toshiba T250

by Tom Fox



The unpacking procedure for the T250 Office Computer from Toshiba (Tustin, CA) warns that "two people are required to handle this unit." With a combined net weight of 56.5 kilos (124 pounds), the admonishment should not be taken lightly. Easily the most massive of any floppy-based computer we have tested, the T250 is overlarge for a business microcomputer; one wonders why it need be so. The basic system, as delivered, will take up four feet of desk space, 19-in. deep—plus a 9-in. by 18-in. area in front for the detached keyboard. It's not a machine that tucks easily into an unused corner of the office.

What do you receive in return when you dedicate this much room to a computer system? You get a newly-designed single-user business computer manufactured by one of the largest industrial companies in the world. You get an 8-bit microcomputer equipped with a full 64K bytes of RAM and a total of 2M bytes of on-line storage divided between a pair of 8-in. double-density, double-sided floppy disk drives. The design has been lavishly tooled, with the appearance of a machine destined for substantial volume production.

The system is intended for first-time computer users. All required hardware comes in three enclosures: a keyboard, a printer and a main unit containing the computer itself with the necessary memory and display screen. The Toshiba microcomputer is delivered complete, with few configuration decisions to make on the hardware side. The catalog lists no accessories that might be utilized

to expand system or disk memory—it is assumed you possess sufficient foresight to purchase what you need the first time around.

Systems software, similarly, is supplied with the basic unit. The T250 relies on the popular CP/M operating system from Digital Research (Pacific Grove, CA). CP/M's greatest feature—that of allowing literally thousands of extant applications programs to run without modification—is an important feature.

Toshiba goes one step further by providing a copy of Microsoft's (Seattle, WA) Basic-80 (sometimes called simply MBasic) and Digital Research's CBasic. These two versions of the venerable Basic language share the largest portion of the pie in today's market. Both languages are supplied in a version that is usable not only for running purchased programs, but for developing applications of your own. If you're new to computing, don't say "I'll never be a programmer" too quickly. The task is a lot easier than it looks at first, and can be a valuable and satisfying addition to your growing list of skills.

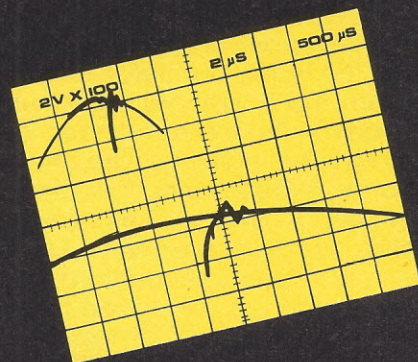
While on the subject of Basic, we should report the findings of our speed-testing on the Toshiba T250. The Prime Number Cruncher (JA Aug 81) is a simple 18-line Basic program that utilizes a pair of nested FOR/NEXT loops to "discover" all the prime numbers up to 1,000. It's far from being a comprehensive test of a computer's worthiness, but we've accumulated readings on well over 100 systems, and find the results revealing in many cases.

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Basic supplied. Version 5.2 of Basic-80 showed a result of 998 seconds, while CBasic 2.08 finished the task in 3,756 seconds. Both were running under release 2.2 of CP/M. These results are somewhat slower than those turned in by other, similarly-equipped microcomputers.

It is typical, by the way, for CBasic to lag behind Basic-80 in our Prime Number Cruncher exercise. This stems largely from the internal representation of numbers in CBasic, which are carried to greater precision than those of MBasic. (Standard precision for MBasic numbers is seven decimal digits vs. 14 for CBasic.) In many applications, of course, computing precision is a great deal more important than raw speed.

***We are fortunate that
today's keyboard
manufacturers see their
keyboard designs as critical
competitive elements.***

The main computer housing is designed and executed on a grand scale. We were eager to attack it with a screwdriver to unearth an internal justification for its heroic proportions and 88 pounds of mass. The 12-in. (diagonal measure) display screen is pretty standard these days, and the twin floppy diskette drives don't *appear* to be any larger than usual. Other than these two elements, the T250 is functionally similar to the portable Osborne I, a computer the fraction of the size of Toshiba's entry.

The reason for the unit's Brobdignagian proportions appears to lie in the area of philosophy, not technical necessity. The computer is built like a navy's shipboard radio; one could imagine this unit surviving a hostile military experience.

Compared to more familiar micros, this example is mechanically overdesigned. Lifting the heavy-gauge steel cover reveals a second layer of metal sheathing providing a second layer of physical protection for many of the tender electronic parts. Cross-bracing brackets and panel stiffeners abound. There are no fewer than seven etched circuit boards inside, all bolted down with an apparent excess of fasteners.

Inter-unit connections are accomplished with robust cables and plugs; most are equipped with strain relief clamps of a sort seldom seen in this kind of equipment. The three 50-conductor shielded cables that exit the rear (for keyboard, printer and telecommunications modem) are at least three

times the diameter of those we are used to seeing for like purposes.

Although the interior of this computer seems as crammed with necessary parts as that of a new automobile's engine compartment, there exist sufficient unused odd-shaped spaces to conceal another whole computer of a more miniaturized design.

The main 12-in. by 13-in. circuit board contains the 8-bit 8085 microprocessor chip, 64K-bytes of RAM and much of the processor's support circuitry. The RAM is contained in but eight dense chips, and it's interesting to note an equal number of unused empty spots that could accept additional memory. A substantial portion of the main circuit board is occupied by the twin tasks of accepting keyboard input and preparing output for the display screen.

The main circuit board is topped with a 6-in. square plug-in piggyback board containing the controller for the two diskette drives. Another board provides serial interface for a modem or other external device. There is a circuit board to control the CRT display, and a complex one that comprises most of the high-frequency switching power supply.

Virtually all of the elements of this computer are manufactured in Toshiba factories. It's unusual, for example, to see floppy diskette drives that are *not* purchased from a specialized vendor. Those in the T250 are substantial, cast aluminum units that slide neatly into tailored sockets. Remove one screw, pull three plugs, and a drive will pop out into a serviceman's hands, complete with all mechanical elements as well as the usual electronic circuitry associated directly with the data storage function.

As users, we are all fortunate that today's computer manufacturers see their keyboard designs as critical competitive elements of their designs. A keyboard is where the buyer literally feels his or her purchase most intimately. The movable keyboard delivered with the T250 is clearly the result of much careful design.

The general arrangement of the keys is conventional (typewriter keyboard on the left with 10-key numeric pad on the right), but detail differences set this one apart. The traditional alphanumeric typewriter keys are white; the remainder, a contrasting dark brown. The main rows are arrayed in the IBM Selectric-originated dished formation, and the index finger keys "F" and "J" are hollowed out distinctively so they can be located without peeking.

There's a row of programmer-defined special-function keys along the top, alongside the often-used CTRL key—somewhat out of reach in this unfamiliar position. We miss a CAPS LOCK key, as the lighted LOCK key provided also causes the numeric keys to be shifted to their alternate punctuated meanings. Several keys are unmarked, including a pair below the SHIFT keys that don't even move. Some of them could have been used

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for cursor control keys, as these important items will be missed in word processor applications. The keyboard contains a handy key marked (IPL), whose meaning will be instantly clear to old-time IBM users. It's a system reset button; the initials stand for Initial Program Load. Finally, a KEY LOCK key disables the keyboard and one marked (HCOPY)/P.STOP turns the printer on when the user is at the CP/M operating system level.

The printer is Toshiba's own P125, a serial dot matrix unit. It's a wide platen printer, allowing a

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maximum of 136 characters across the page. The characters are formed by a series of nine ballistically-driven wires carried on a print head travelling back and forth in front of the paper. Each letter or number is made up of a pattern of ink dots fitting within a 9-high by 7-wide matrix. To increase throughput speed, an internal electronic buffer allows lines of print to be formed when the printhead is moving left-to-right or right-to-left. An original and up to two carbon copies can be produced with each pass. In common with many current designs, this printer has provision for accepting paper either from the rear or via a slot in the bottom.

The P125 is a "simple" printer, lacking some of the features found in today's most advanced paper eaters. The tails of the lower case *g*, *j*, *p*, *q* and *y*, for example, do not descend below the bottoms of the other letters. Character spacing is a fixed 10-per-inch horizontally and 6-per-inch vertically.

Perhaps most crippling is the fact that the printer's rated speed of 125 cps can seldom be realized in real-life applications. This is because the printhead

shuttles back and forth in a fixed single-speed lead-screw mechanism. Once the head begins its journey from one margin to the other, there is no way for it to return without travelling all the way to the other side. Thus, the full 125 cps-speed is only true for 136-column wide printouts. A line of print with a single character (in any position) requires over a full second to complete. It would be more accurate to describe the P125 as a 55 lines-per-minute (LPM) printer.

The T250's documentation is better than much of its competition, but somehow falls short of living up to its implied promise. It seems as if the intention is there to provide superior manuals, but the project simply ran out of time.

The written knowledge for this computer is delivered in two loose-leaf binders and a separate *Cbasic Language Manual* (directly from Digital Research). The first volume leads off with a nicely-designed 140-page *User's Guide* that leads the reader through the installation and operation of the computer and its major software elements. Written for the computer novice, the well-illustrated text is certain to be educational to all who read it. The chapters that tutor the beginner on the most important concepts of CP/M and MBasic, in particular, could serve as models for other computer manufacturers to follow.

The *User's Guide's* depth of coverage, however, is disappointingly uneven. A well-done explanation of floppy disk operation, for example, is followed by a thin listing of the printer's major specifications, instead of words that would help the user understand its operation more completely. One has to search through the keyboard description (and the two Basic manuals) to learn how to coerce the printer to actually make ink marks on paper.

The remainder of the manuals are verbatim reprints of Microsoft's *Basic-80 Reference Manual* and the familiar collection of Digital Research's CP/M guides that have befuddled a generation of micro users. The Microsoft book includes a sheet informing us that six of the included appendices



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are not relevant to T250 users. We hope that the loose-leaf format of Toshiba's user manuals is a sign that the company intends to continue the development of its written products.

The T250-4 we tested is Toshiba's top-of-the-line office microcomputer. It includes 64K bytes of main memory, a pair of 1M-byte 8-in. disk drives, the CP/M operating system and both Basic languages—MBasic and CBasic. This assemblage lists for \$5,995.

Business computers need printers, so plan on adding \$1,095 for the 125 cps dot matrix printer, or \$795 for the brand-new 100 cps dot matrix unit. If word processing is your goal, Toshiba offers a 55 cps daisywheel unit offering letter-quality results for \$3,295. A slower 40 cps version is available for \$1,100 less.

A single-floppy drive version of this computer, the T250-3, is available for \$1,000 less than the dual-drive system we examined. Going the other direction, Toshiba has just introduced the T250-5, a hard disk-based unit. This model features a 5M-byte Winchester-technology 8-in. drive along with a single 1M-byte floppy like the one we used in our evaluation. The T250-5 lists for \$7,995.

A good selection of additional software is available at extra cost. This ranges from a Whiz-Communications Option for connection to a telephone modem at \$150 all the way up to a \$2,000 collection of business accounting packages from SSG. The catalog lists most of MicroPro's "star" series of programs (WordStar, SpellStar, etc.) at competitive prices, beginning at \$495 for the basic WordStar. Also offered is the Microplan business planning language and its enhancements, starting at \$495.

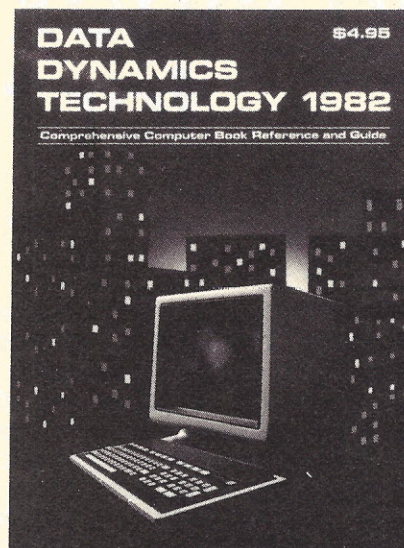
The T200 family of business computers is a scaled-down version of the T250 we tested. Differing only in its use of 5.25-in. minifloppy diskette drives (with but 28% of the capacity of the 8-in. floppies), this series of micros is available at prices ranging from \$1,300 to \$2,000 less than their full-sized siblings.

Toshiba also offers its EW100 line of word processors. These are actually T250 computers with a set of dedicated word processing software in place of the CP/M and Basic languages listed above. Expect to pay a premium of \$3,000 to \$3,300 for an EW100, and don't forget that a more expensive letter-quality printer is required to make the word processing software effective.

Technical Editor Tom Fox has authored over 50 articles and editorials for IA since May, 1979. He has spent his entire 21-year career in the field of electronics; with the last 14 years devoted to computer systems and their application to business and industry. He is President of FoxWare Systems Corp. (Irvine, CA), a firm specializing in the integration of microcomputers and applications software for small business users.

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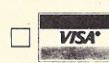
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Two Index Card Programs for the Apple

by Carl Heintz, CPA

An increasingly popular use of computers is to keep track of information in the form of a database. For accounting information, there are a number of programs that do an excellent job of storing, manipulating and reporting numeric information. There are also many excellent programs for storing names and addresses—mailing lists, phone numbers and the like. For accounting information and simple names and addresses, there's no lack of available software.

Many computer users have other uses in mind, though. Consider the following information requirements: phone messages/phone conversation log; patient records/medical histories; inventory/product descriptions; sales call reports; research files and personal records/performance reviews.

In each of these applications, the nature of the information requirements differs from the capabilities provided by the average database or mailing list program. The major difference is probably that the user will need to save a substantial amount of text—either in the form of notes, paragraphs of information, or brief comments. In each of the applications, there is a need to access the information in more than one way. The user will want to index it on multiple keys. How does one approach this problem on the Apple computer?

The simplest way is to select a program oriented toward these unique data storage and retrieval requirements. There are a number of choices; let's consider two that run on the Apple II.

VisiDex

VisiDex (VisiCorp, Sunnyvale, CA) is organized around the concept of a blank screen upon which the user may write anything desired. The files created can be several screens long. The program uses the Apple's disk capacity just like a file drawer with the folders inside. The files are recalled via keywords. Several keywords can be used, so that a file can be accessed from different retrieval viewpoints. A keyword can be created either by going through a formal definition of a keyword, as a function, or by indicating that certain information entered in the computer represents a keyword. The latter procedure is very useful when typing in text and it is desired to make one of the words entered

into a keyword. The user merely types CNTRL-K and a keyword exists. Keys can also just as easily be dropped.

Searching for information can involve multiple criteria. For example, in *VisiDex*, one can search through both keys and the material in a screen. A user might specify the key Portland, and, by using the "&" and a word from the text (say Time), he can search all of the files that have Portland as a key word and contain "Time" in their text matter. That is *power*.

Some of us prefer structure. Irrespective of the freedom created by the "free-form," it is beneficial to have some organization. *VisiDex* provides for this through the use of data templates. Templates are nothing more than a standard form for gathering information. They allow the user to create a standard format for entering information—and display a form much like a paper form on the screen. They are useful for organizing and speeding data entry, particularly in business applications. Templates can be used to create keywords automatically. By specifying certain elements as being keywords, a great deal of work is cut out and a predictable uniformity in keywords is created. The templates are easy to construct and can be used over and over again.

Business users often have to search through not only factual or string data, but through numeric data. Consider, for example, the problem of finding all employees who have at least five years of seniority. It sounds like a trivial problem, but without the capability for numerical searches using > and < (greater-than or less-than), the task is cumbersome. *VisiDex* provides for a search capability enabling one to specify numeric parameters and ranges.

The *VisiDex* programmers realized that many users will want to keep their schedules on the system, so they provided for a calendar-at-a-glance option. When selected, the system presents a calendar—an entire year is on the system. A calendar by itself isn't much use to anyone, so the system has a schedule that can be set up for each date. The user initially views a calendar, then selects a date—and the system will display all of the entries, appointments or deadlines for that date.

There are some special features of the VisiDex program that few other programs have. One is the capability to utilize a clock card and dynamically include date and time information in the records created. As a lateral application, it can set up an alarm clock to remind the user of an important schedule item. This application is novel and requires a clock card and some interfacing to get operational. The VisiDex program supports all upper and lower case adapters.

VisiDex is part of a series of programs that include VisiFile, VisiCalc, VisiTerm and VisiPlot. The information that can be generated in VisiDex is (with certain exceptions) basically compatible with other programs in the series. The user has the capabilities, in certain cases, to pass information from one program to the others. However, in the typical VisiDex application, such a transfer would not be useful, due to the structure of the data in VisiDex and its intended application.

The program requires 48K bytes of memory and one disk drive. It allows for 16 sectors, an upper/lower case adapter and a clock board interface.

PFS

PFS (Software Publishing Co., Mountain View, CA) is very structured. VisiDex offers the user the option of creating "input masks." The PFS system is primarily designed around that concept. Extensive menus are used throughout—so many that one hardly needs the manual after becoming familiar with the program's capabilities.

The PFS system uses the concept of pages in the same fashion as the other programs. Each record can have several screens or pages associated with it, and there can be numerous records in a file.

The system allows the option of changing the "form" format used to enter information into the file either before or after information has been entered into the database. This reformatting option is especially important when experimenting with a new data application.

While the system is oriented towards setting up specified fields, there is no reason why it cannot be used to fill in free-form pages that contain paragraphs of text. This feature is useful, particularly when setting up a form that requires a comments section.

Finding information with PFS is similar to the VisiDex approach. Keys are established when the data is entered. These are used later to retrieve the information. The PFS system includes numerical searches. While both VisiDex and PFS have similar capabilities, the PFS manual is more detailed on how to use those capabilities.

Printing capabilities of PFS are superior to VisiDex. The user can get a printed copy in exactly the same format as the screen. Both programs provide

this, but PFS goes further, including some options that allow a special format.

The standard printing format allows for a number of sophisticated options, including sorting printouts based upon a field in the data, printing more than one item per line or just printing text. The user can specify whether to print the item field name or just the item. The user also has the choice of which fields are to be printed out. This is useful in a situation where the user doesn't want to dump everything out of the file.

The significance of this feature cannot be over-emphasized. For example, assume that your application is a name, address and telephone number list. To get mailing labels is a reasonable expectation from the system. Unless you're using PFS, though, don't plan on it. The manual even includes a sample of how to format this particular application. Forms can be stored for use with several different files, and can be modified or deleted as necessary.

PFS, like VisiDex, is part of a series. In the case of PFS, the other program in the series is a report formatter that uses the information in PFS files to produce more complex and varied reports. With the companion report, the user has the option of creating reports that have subtotals, grand totals, listings of information (columns and rows), etc. The Reporter brings to the PFS user the capabilities of any standard database to manipulate numbers and information.

Which is the best? The "best" system is the one that does the job most efficiently for each user, given that user's particular likes and dislikes. Both programs are good programs, produced by reputable companies, with thorough documentation. The programs are somewhat different in their implementation of computerizing the index card, but their approaches are surprisingly similar.

After experimenting with the two programs, there are some apparent differences.

For the personal user who does not need or want to create reports or forms, but rather wants to have just a free-form storage of information, VisiDex is a good program. Also if a user anticipates some need for a structured input of information, and would like to have the capabilities of a form in addition to a free-form input, VisiDex is superior.

If the user anticipates using the system to store numeric information, or desires to produce extensive written reports from the database—such as mailing labels—PFS is the logical choice.

As with any program, selection centers upon the individual user and his application. A busy accountant might find VisiDex to be perfect to keep his appointment calendar on. The lawyer might find the PFS system superior for his name and address application, because he can include information about the client's cases in his files. □

Spellproof A Spelling Checker for Oasis

by Donald M. Dealy

Proofreading text for spelling and typographical errors has always been a tedious chore. The quality of written material is contingent upon freedom from unnecessary errors. If you are writing with the aid of a word processor, there are a number of spelling checkers that can ease the burden of proofreading. Users of a system running under the Oasis operating system can check input for spelling and typographical errors with Spellproof from Quantum Information Systems (Seattle, WA).

Generous menus and prompt screens guide the user through the program, making Spellproof easy to use. The major functions include: Run Proofreader; Set Defaults; Print Dictionary; Reorganize Dictionary; Create Dictionary; Add words to Dictionary; Delete words from Dictionary; and Quit—Return to CSI.

The manual should be satisfactory for anyone familiar with Oasis since it follows the same style as those supplied with the operating system. The manual doesn't have an index—but contains a very complete table of contents. Documentation is contained in a formidable three-ring binder. Each chapter is separated by dividers with clearly labeled tabs. The manual is divided into the table of contents, seven chapters and seven appendices.

The sample session is initiated by entering the command SPELLPRF—with or without the file name and options. The primary menu provides for the selection of the various functions. The proofreading session is activated by entering 1. The secondary menu will then display the defaults as established by a dictionary, and prompts the user for any missing parameters. The length of all entries is indicated to assure correct responses. Defaults can be changed before running the proofreading program. Three responses are allowed to the action prompt: (R)un, (C)hange and (Q)uit.

Programmers often find it difficult to provide the proper amount of information on the screen to adequately tell what the system is doing. The messages must be complete and timely, but of a tutorial nature. The manual illustrates and explains the screens that will be displayed as each part of Spellproof is performed.

Information supplied by the screens includes the name of the file being processed, the user dictionary for the session, the number of words in the file and the number of unique words in the file. Also included is the number of words matched against

the basic dictionary and against the user dictionary. The basic dictionary is supplied with 20,000 words, and can be increased by adding selected words. The size of the dictionaries is limited only by the storage capacity of a particular system.

Another screen reports the number of words not verified. These are words that were not found in either the basic or the user dictionary. In the sample session, there are 16 words not verified. The first word in this list is displayed on the screen, and seven action codes are provided from which the user can select a response. The following actions are allowed: add the word to the master library; ignore it; mark it in the file; cancel the proofreading session; list the remaining words; add the displayed word to the user library; and repeat last action for words remaining.

The words in the list may be processed by displaying each word and taking the appropriate action, or all of the words in the list can be marked in the file with the marking character. The default marking symbol is #, but this can be changed whenever necessitated by a document containing # as part of the text. Once the words have been processed, checking and correcting of misspelled words transpires. A global search function locates the marking symbol found in front of each word marked by the program.

A word is defined by the program as beginning with the first appearance of an alpha character. The end of a word is considered to be a nonalpha character or a dash. Words with a "hard" hyphen are regarded as one word. There is one exception to this. A word that is hyphenated at the end of a line where the hyphen is followed by a carriage return will be handled as two words. Word processors that use a "ghost" hyphen cause no trouble, because they are stripped from the file for checking purposes. It is possible for some correctly-spelled words to be marked. As these are located in the text, the marking character can be quickly deleted. Words may be spelled correctly, and yet be incorrect as used, such as to, too and two. This will be undetected as this is a task for a grammar checker—not a spelling checker.

The ability to ignore a displayed word during the proofreading session is a useful feature. There may be words that are correctly spelled that are not found in the dictionaries, and you may not wish to make them permanent entries. A quick visual

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check will indicate if a mismatched word is spelled correctly, and can then be ignored.

It is necessary to include all the common endings of words in the dictionaries such as ed, ing, er and s. Spellproof will need much larger dictionaries than some spelling checkers because it uses a literal dictionary approach. The speed of operation does not appear to be slower and the literal approach ensures greater accuracy. A dictionary using the root word approach may allow combinations that are not valid, and require additional operator time in handling these errors.

Spellproof does not provide for contextual display of words during the proofreading session. It is necessary to wait until the file is displayed before the context of a word is known. The accuracy of some words cannot be determined unless seen in context. To display a word in context during the proofreading session usually causes a spelling checker to run slower. Contextual display can generally be handled faster by a text editor.

Additions to dictionaries are made in an overflow area. As this space is filled, the search process takes noticeably longer. This is handled by a reorganization procedure, which will again arrange the words in alphabetical order.

There are two ways to display the contents of a dictionary: on the screen or on the printer. The words will be listed in as many columns as length allows.

Spellproof provides functions to facilitate adding or deleting words from a dictionary. A file is first created that contains the words subject to inclusion or expulsion. This file is then used to process the old dictionary and create a new one that will contain the desired words.

Speed is obviously an important aspect of a spelling checker. Spellproof has been benchmarked on an Onyx Model 8001 MU-18 4MHz CPU with an 18M byte 8-in. Winchester hard disk drive at over 30,000 words per minute. The time in this test was for both reading the file and matching the unique words list against the dictionary. We checked the example document (which has 2,275 words) using a floppy disk system on a TRS-80 Model II. It required about 15 seconds to read the file and determine the existence of 530 unique words. About 1.75 minutes were then consumed while matching the 530 words against the basic and user dictionaries.

It took about 45 seconds to individually inspect the 16 words not verified, and indicate whether the word should be marked or ignored. Time required to check each word will depend upon how many times a dictionary needs to be consulted to determine the correct spelling of a word in question.

Spellproof was run against the file containing this review. It took 18 seconds to read the original 2,280 words in the file and prepare a list of the 592 unique words. It required 1 minute and 38 seconds to match

the list of unique words against the basic dictionary and 22 seconds to match the remaining words against my user dictionary. There were 27 words that were not verified against either of the dictionaries. We could have chosen to have all of the unverified words marked in the file, and then returned to the text editor and checked quickly in context with the help of the global search command. We chose instead to examine these words individually. We marked those we knew to be misspelled, and ignored those we knew were spelled correctly—and did not care to add to the dictionaries.

A recent proofreader comparison article (JA May 82) compared six spelling checkers on the first 325 words of the report. We used the same 325 words for a test of Spellproof. We included 10 spelling errors in the file used for this test—just as done in the original report. Spellproof reported the existence of 211 unique words in the first 325 words of the report. Using the basic dictionary—and a small personal dictionary that we created—Spellproof reported all 10 spelling errors and 15 additional suspect words. The running time for our test of Spellproof was 1 minute, 48 seconds.

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Spellproof obtains its speed by the creation of the list of unique words from a file being proofread. It is possible for a file of 30,000 words to have only 500 unique words. Spellproof matches only the unique word list against the dictionary—so a file is checked in a very short time. The length of a document has very little influence on the speed of checking, especially when a hard disk system is being used.

Processing speed is aided by the careful development of user dictionaries. By keeping the basic dictionary and the various user dictionaries small in size, assimilation will be faster than if there were one or two very large dictionaries. User dictionaries should be developed according to specialized topics, such as accounting, medical, legal or mathematical. If a file is mostly related to accounting, the accounting dictionary would be used. It would not be necessary to have legal or medical words in the dictionary. Keeping the dictionaries small is important to make a spelling checker run faster. This technique is more important for users of floppy disks. It may not be very helpful on a hard disk system.

The program comes on two single-density diskettes. Since it would be very unusual for both diskettes to be faulty, it should not be necessary to wait for a replacement copy of the program because the program diskette won't run. The company has made no attempt to keep the user from making backup copies. A serial number is used to ensure that the program can be used on only one Oasis operating system. It will not operate on a system with a different serial number. Supplying copies of the program to friends will be of no value, unless they know how to change the serial number, or unless they have a copy of your Oasis operating system—which is illegal.

When errors occur, they are efficiently dealt with. In most instances, you will be informed of an invalid entry, and returned to the action prompt for a necessary change. Informational messages that result from the few errors that can be made clearly indicate the problem and suggest the change needed.

Protection is provided by Spellproof against most major processing errors through the creation of a backup copy of the file being checked prior to the checking process. Even a power failure during processing could be dealt with by the use of this backup file.

Overall, Spellproof compares favorably with other spelling checkers. It is fast, easy to use and contains many helpful features. □

Donald M. Dealy is Director of Data Processing Services for Fuller Memorial Hospital (South Attleboro, MA.) He is developing a complete microcomputer accounting system for the hospital's nursing home.

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MODE=NORMAL ORDER=R/O ROW=1-50

ROW 1 (Net Sales) <--
ENTER COMMAND:

| ROW | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | | |
|-----|------------------|-------------------|------------------|-------------------|---------|----|
| 1 | 1,000.0 | 1,100.0 | 1,210.0 | 1,331.0 | 4,641.0 | 44 |
| 2 | 450.0 | 489.5 | 532.4 | 579.0 | 2,058.9 | 45 |
| 3 | 200.0 | 220.0 | 242.0 | 266.2 | 928.2 | 46 |
| 4 | 300.0 | 350.0 | 400.0 | 450.0 | 1,500.0 | 47 |
| 5 | 950.0 | 1,059.5 | 1,174.4 | 1,295.2 | 4,479.1 | 48 |
| 6 | 50.0 | 40.5 | 35.6 | 35.8 | 161.9 | 49 |
| 7 | 5.0 | 3.7 | 2.9 | 2.7 | 3.5 | 50 |
| 8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 51 |
| 9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 52 |
| 10 | 45.0 | 44.5 | 44.0 | 43.5 | 0.0 | 53 |
| 11 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 54 |
| 12 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 55 |
| 13 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 56 |
| 14 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 57 |
| 15 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 58 |
| 16 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 59 |
| 17 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |

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Installing a Micro... The Hidden Costs

by Reginald D. Gates

How often have you heard this? "I wanted to get a personal computer to help out my group, but those hard-nosed idiots in the Data Processing department wouldn't approve my requisition." We seem to see battles over personal computers that pit possible users in the company against the central data processing department. The potential users see the people in DP as rigid, protective and unsympathetic to the user's needs.

As it happens, I have a foot in both camps. I am a member of middle management who used his personal computer for project control purposes and I am a member in good standing of a large, centralized DP department (we run six IBM 3033s). I fully believe that personal computers can be a great management tool. They improve productivity, reduce stress and increase job satisfaction, when used wisely. But like any tool, personal computers can be mis-used, and their uncontrolled spread in a company can be a prelude to a real DP disaster. Let me put on my DP hat and point out some of the potential problems.

Let's start with the following scenario. Mike Manager must control the installation of new presses for the XYZ Tooling Company. This includes site preparation, delivery, set-up and initial check-out, all done on a very tight schedule. His task is complicated by the fact that Mike has only one set-up crew and the three XYZ factories are in widely separated parts of the country. Mike decides that the only way to manage this is through some sort of automated PERT scheduling. Since you can't get anything through DP (besides, he's over his DP budget), Mike elects to implement his scheduling on his personal computer (purchased as "office equipment"). It takes Mike three weeks of heavy overtime work in the evenings to get a rough scheduling system going. However, after a couple more weeks for fine-tuning, his system really starts to pay off. The first three presses go in on time and under budget and he has got the rough schedules set for the next ten installations.

What's wrong with this? Fundamentally, an expensive component of the XYZ company's operations now depends on a system that is not backed up, compatible or documented. Let's look at each problem area in turn.

First, what happens if Mike's machine goes down? ("We think that the bug is in the disk controller board—it'll only take four or five weeks to fix"). There is no manual procedure that he can fall back on

to do the scheduling—Mike must run his system or the press installation will fall apart. Another personal computer system like his original must be found (or purchased) in a very short timeframe.

Suppose the problem isn't hardware—but a bad disk. Does he have a backup disk? Of course. It was taken just ten days ago (or was it twelve?). A copy of the data Mike has input since then must be somewhere on his desk, mustn't it? Well, maybe he can remember most of it with the help of some phone calls.

While he may be able to find another computer that can run his system, the odds are that Mike doesn't have enough backup data to re-create any files that become unreadable. It takes a lot of discipline and effort on the part of a professional DP organization to provide data backup, and it is extremely rare to see similar efforts on a personal computer.

Another major problem with Mike's system is that it's not compatible with other systems. Charlie is in charge of installing lathes and would like to use Mike's system, since it worked so well for the installation of the presses. Charlie has a personal computer too, but it uses CBasic and Mike wrote in Applesoft Basic. (Remember, both machines were bought "sub rosa," so no standards were followed). Who does the translating? Even if by chance, both computers happen to be the same brand, do they run the same operating system and have the same resources (e.g., memory and disk space)? It seems a shame that Charlie has to re-invent the wheel and duplicate Mike's efforts, but that's the end result when the computer systems don't match. Without compatibility, systems and programs can't be shared, let alone data. And if we want compatibility, someone has to set and enforce standards on the purchase of personal computers.

Finally, there is the problem of documentation. One of the most appealing features of personal computers is that their programs can be tailored to fit an individual's needs. This same feature makes it very difficult for someone else to use an existing system without good documentation. Is there a run book—or system flowchart—or user manual for Mike's system? Of course not. Suppose Mike decides to leave XYZ and enter a monastery. How will his replacement operate the system without some sort of documentation? The bottom line is that the lack of documentation makes the system

practically useless to anyone but Mike. If XYZ loses him, they must be prepared to discard the system or spend a fair amount of resources to "generalize" his system and document it.

If personal computers are to be used successfully by a company, three things must happen:

1) Standards must be adopted and enforced to assure compatibility.

2) If the operations of a component becomes dependent on a personal computer, the software must be "generalized" and documented, so that others can use it and it can be run on multiple systems.

3) The company cannot be allowed to depend

on any system that is not recoverable in the case of a hardware or software failure.

If these three goals are not met, the uncontrolled use of personal computers in any company may become an inefficient—and expensive—proposition. □

Reginald D. Gates is a Section Manager with McDonnell Douglas Automation Company (McAuto) in Cypress, CA. He supervises a group of system analysts responsible for the enhancement and maintenance of a large on-line inventory control, purchasing, and accounts receivable system.

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Screen Writer

by David D. Busch

Screen Writer is a very flexible program that lays out a custom menu, non-graphics screen display, or a series of other CRT images using full-screen cursor control similar to word processing. The user simply presses ENTER, and the computer looks at what has been drawn on the screen and obligingly writes a short Basic subroutine to reproduce it exactly.

Unlike Instruct/Bas (JA, Sept. 81), which wrote a standardized screen image program that could only be used for program documentation, Screen Writer may be applied to many tasks. A border may be included around the entire frame (asterisks, or some other keyboard character), or two, three or more smaller boxes may be built within a single frame—each containing different information. Custom designed program menus may be constructed for specific purposes, while basic games screens can be assembled, and "players", "missiles" and other details inserted during play by POKES or PRINT @ commands.

Screen Writer should be operated as if it were a screen-oriented text editor. Lay out your display exactly as you want it to appear. Then, specify a beginning line number, line number increment and a file name for the finished code. The program will then write a suitable subroutine that can be merged with an existing program to produce the desired display.

Ordinarily, line-oriented program input and editing are somewhat tedious. Especially when neat, nicely formatted screen layout is desired. It's necessary to use a copy of the TRS-80 Model I or III screen map, and do a great deal of laborious notation on PRINT @ locations or POKES to video memory. Even less complicated layouts require calculating TAB positions and other time-consuming tasks. Consider the work that would be involved in programming a display to provide the menu shown in table 1.

With Screen Writer, simply use the arrow keys to move the cursor around on the full screen. Press character keys to place alphanumerics where desired. The layout can be quickly done by eye. However, as an aid, a graphics block appears whenever the cursor is located in the exact center and far left-hand edge of the screen. This block appears only when the cursor is being moved by the arrow keys. If you move it by using the space bar or by entering characters, it will not appear.

When finished, hit ENTER, specify the line numbers desired for this subroutine, and collect the finished program module from your disk a few minutes later.

There, stored in ASCII form (ready for MERGE) will be 16 program lines that reproduce what was designed on the screen. Instead of 15 or 20 minutes of coding, running the program to check the appearance of the output, making changes, and so forth, you have three to five minutes of typing with a word-processor-like tool.

The trick is accomplished by PEEKing in video memory, noting what character (if any) has been placed there by the user, and assigning each screen line to a separate element of a string array, L\$(n). Then, each of the elements in L\$(n) are used to assemble an appropriate program line, which prints the entire line to the user's screen. For example, if line 1 consists of 30 spaces, four asterisks and 30 more spaces, that entire line will be PRINTed in the resulting program. Screen Writer counts the spaces up until the first alphanumeric character and writes an appropriate TAB statement to jump to that point. Once the last character is printed (the rest of the line consists of spaces), the PRINT string is terminated. Our example line 1 above would be reproduced as:

```
10 PRINT TAB(30)"*****"
```

The program is divided into two main sections. The first allows user input of the screen design. An INKEY\$ keyboard strobing loop looks for input (line 240). If ENTER has been pressed (CHR\$(13)), control drops down to the video memory peeking/program assembly section. Otherwise, Screen Writer looks at the character input to see if it was an arrow key (character strings 8, 9, 10 and 91). If so, one of four subroutines are accessed, which move the cursor in the indicated direction.

The cursor is not allowed to move off the top of the screen or past the 15th line of the display. To check for this condition, each subroutine first looks to see whether or not the proposed position (Z) for the cursor would be less than 15360 (in video memory, defined as B in line 40), or more than 16321 (defined as E in the same line).

If the new move is okay, then a space (SP=32) is POKED into the old location, and C (CHR\$(43), a plus sign) is poked into the new. Control passes back to the INKEY\$ line for further input. If the character entered is not an arrow key, that character is POKED to the screen.

The second section of the program, beginning at line 670, PEEKs at the entire video memory, noting what character appears there. A FOR-NEXT loop from 0 to 1023 (the number of video memory



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locations to be PEEKed) is STEPPED off in jumps of 64, corresponding to the length of each screen line. A nested loop takes each of these 64 characters, and uses them to build a program line, which is stored in PR\$.

Spaces are ignored, so PR\$ does not take on any characters until the first alphanumeric is found (line 750) and BFLAG is set to the value that corresponds with the beginning of the characters on the screen line. The last position of an alphanumeric character is continually updated (EFLAG) everytime a non-space (CHR\$(32)) is encountered (line 760).

When all 64 characters on a given line are PEEKed, control drops down to line 780, where any existing trailing space is deleted and the program line built. If no characters were discovered (BFLAG=0), the line consists only of the statement PRINT. Otherwise, a line number (LN) and increment (IC) are added, converted to string through STR\$ and concatenated with a TAB statement that forces a jump to position BFLAG-1 on the video screen. The actual characters found are added to the string, completing the program line. If the line is 64 characters long, a semi-colon is tacked onto the end to avoid an extra linefeed.

Beginning line number and increment can be chosen by the user, so that several screens may be designed—one after another—with non-conflicting line numbers, and merged in a series with a target program.

Contributing editor David D. Busch has written more than 200 articles on computers, applications and word processing. His profiles of mainframe and minicomputer installations have appeared in many computer trade publications. In the past two years, he has devoted special attention to personal and small business computers as a programmer, reporter and observer.

Table 1. Sample menu

- 1.) Load disk file
- 2.) Save disk file
- 3.) Create file
- 4.) Access data base
- 5.) Update data base

→ Enter choice:

Program listing

```

10 CLEAR 10000
20 DEFINT A-Y
30 DIM PR$(16)
40 B=15360:E=16321
50 Z=B
60 C=43
70 SP=32
80 / ***** CHECK KEYBOARD FOR ARROW
OR CHARACTER *****
INPUT
90 CLS
100 PRINT:PRINT
110 PRINT "Use arrow keys to move cursor,
alpha numeric keys to"
120 PRINT "lay out screen format and message.
Hit ENTER when done."
130 PRINT
140 PRINT"                               Hit any key when ready"
150 IF INKEY$="" GOTO 150
160 CLS
170 INPUT "ENTER BEGINNING LINE NUMBER";LN
180 IF LN=0 THEN LN=1
190 INPUT"ENTER INCREMENT";IC
200 IF IC=0 THEN IC=1
210 LINEINPUT "ENTER FILE NAME FOR THIS MODULE : ";F$
220 IF F$="" THEN F$="TEST"
230 CLS
240 A$=INKEY$:IF A$="" GOTO 240
250 IF A$=CHR$(13) POKE Z,SP:GOTO 670
260 IF A$=CHR$(91) GOTO 350
270 IF A$=CHR$(10) GOTO 430
280 IF A$=CHR$(9) GOTO 510
290 IF A$=CHR$(8) GOTO 590
300 A=ASC(A$)
310 POKE Z,A
320 IF Z+1<E THEN Z=Z+1:POKE Z,C
330 GOTO 240

340 / ***** CURSOR UP *****
350 IF Z-64<B GOTO 240
360 POKE Z,SP
370 Z=Z-64
380 Z1=Z-15360:IF Z1/32=INT(Z1/32) THEN C=191
390 POKE Z,C
400 C=43
410 GOTO 240

420 / ***** CURSOR DOWN *****
430 IF Z+64>E GOTO 240
440 POKE Z,SP
450 Z=Z+64
460 Z1=Z-15360:IF Z1/32=INT(Z1/32) THEN C=191
470 POKE Z,C
480 C=43
490 GOTO 240

500 / ***** CURSOR RIGHT *****
510 IF Z+1>E GOTO 240
520 POKE Z,SP
530 Z=Z+1
540 Z1=Z-15360:IF Z1/32=INT(Z1/32) THEN C=191
550 POKE Z,C
560 C=43
570 GOTO 240

580 / ***** CURSOR LEFT *****
590 IF Z-1<1 GOTO 240
600 POKE Z,SP

```

```

610 Z=Z-1
620 Z1=Z-15360:IF Z1/32=INT(Z1/32) THEN C=191
630 POKE Z,C
640 C=43
650 GOTO 240

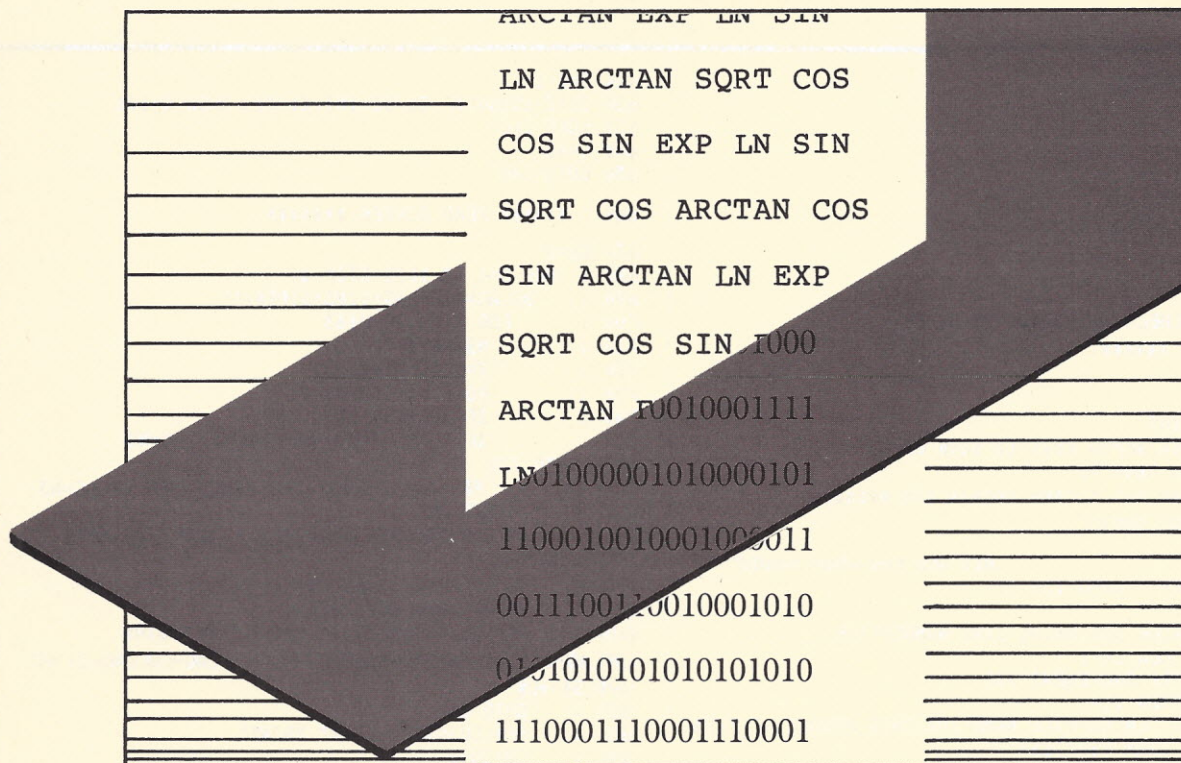
660 / ***** READ SCREEN *****
670 CU=1
680 : FOR N=0 TO 1023 STEP 64
690 :   BFLAG=0:EFLAG=0:N3=0:PR$=""
700 :   FOR N1=N TO N+63
710 :     N3=N3+1
720 :     T=PEEK(N1+15360)
730 :     POKE N1+15360,191
740 :     IF BFLAG>0 GOTO 760
750 :     IF T<>32 THEN BFLAG=N3:EFLAG=N3
ELSE GOTO 770
760 :     PR$=PR$+CHR$(T):IF T<>32 THEN EFLAG=N3
770 :     NEXT N1
780 :     IF RIGHT$(PR$,1)=CHR$(32) THEN PR$=LEFT$
(PR$,LEN(PR$)-1)
790 :     IF EFLAG=64 THEN L$=";" ELSE L$=""
800 :     IF BFLAG=0 GOTO 830
810 :     PR$(CU)=STR$(LN)+PR$ TAB("STR$
(BFLAG-1)+")"+CHR$(34)+MID$(PR$,1,EFLAG-(BFLAG-2))+C
HR$(34)+L$
820 :     GOTO 840
830 :     PR$(CU)=STR$(LN)+PR$ PRINT"
840 :     CU=CU+1
850 :     LN=LN+IC
860 :     NEXT N

870 / ***** SAVE FILE TO DISK *****
880 OPEN "O",1,F$
890 : FOR N=1 TO 15
900 :   PRINT #1,PR$(N)
910 : NEXT N
920 CLOSE 1

```

Table 2. Important variables used in Screen Writer

| | |
|---------|--|
| A\$ | Stores character input from keyboard by user. |
| B | Beginnings of video memory |
| BFLAG | Position of first alphanumeric character in screen line. |
| C | Cursor, a plus sign. CHR\$(43) |
| CU | Counter, used to keep track of program lines (PR\$(n)) as built. |
| E | Last video memory location available for screen writings. |
| EFLAG | Position of last alphanumeric character in screen line. |
| F\$ | File name for module being built. |
| IC | Increment between line numbers of module. |
| L\$ | Last character in program line, either semicolon or null |
| LN | Line number of current line being built. |
| N | Loop counter. |
| N1-N3 | Loop counters. |
| PR\$ | Current program line being assembled. |
| PR\$(n) | Finished program lines. |
| SP | Space, CHR\$(32). |
| T | Current character being PEEKED. |
| Z | Current cursor position. |
| Z1 | Check to see cursor centered. |



JRT Pascal, Version 2

by Alan R. Miller

There are now several CP/M versions of each of the popular computer languages such as Pascal, Basic and Fortran. Many of these have been discussed in previous issues. In particular, three of the CP/M Pascal compilers have been reviewed: JRT Pascal (JA May 81), Pascal/MT+ (Jul 81), and Pascal/M (Jan 82). They are similar in many respects; however, each version has distinct advantages and disadvantages.

Version 2 by JRT Pascal (San Francisco, CA) has recently been released. Its most striking feature is the low price of \$30, just one-tenth of its former cost. The price includes a diskette of the software and a 120-page user manual. This is a standard implementation of Pascal that incorporates the usual enhancements. An assembler and auxiliary Pascal programs are also included.

Pascal compilers are implemented in one of three ways. For example, a Pascal compiler can create an assembly-language source program that is then run through an assembler. Pascal/Z uses this method. Another approach is to create a relocatable module, which is then linked into an executable program. Pascal/MT+ works in this way.

The third method is to generate an intermediate P-code file, which is interpreted by a run-time

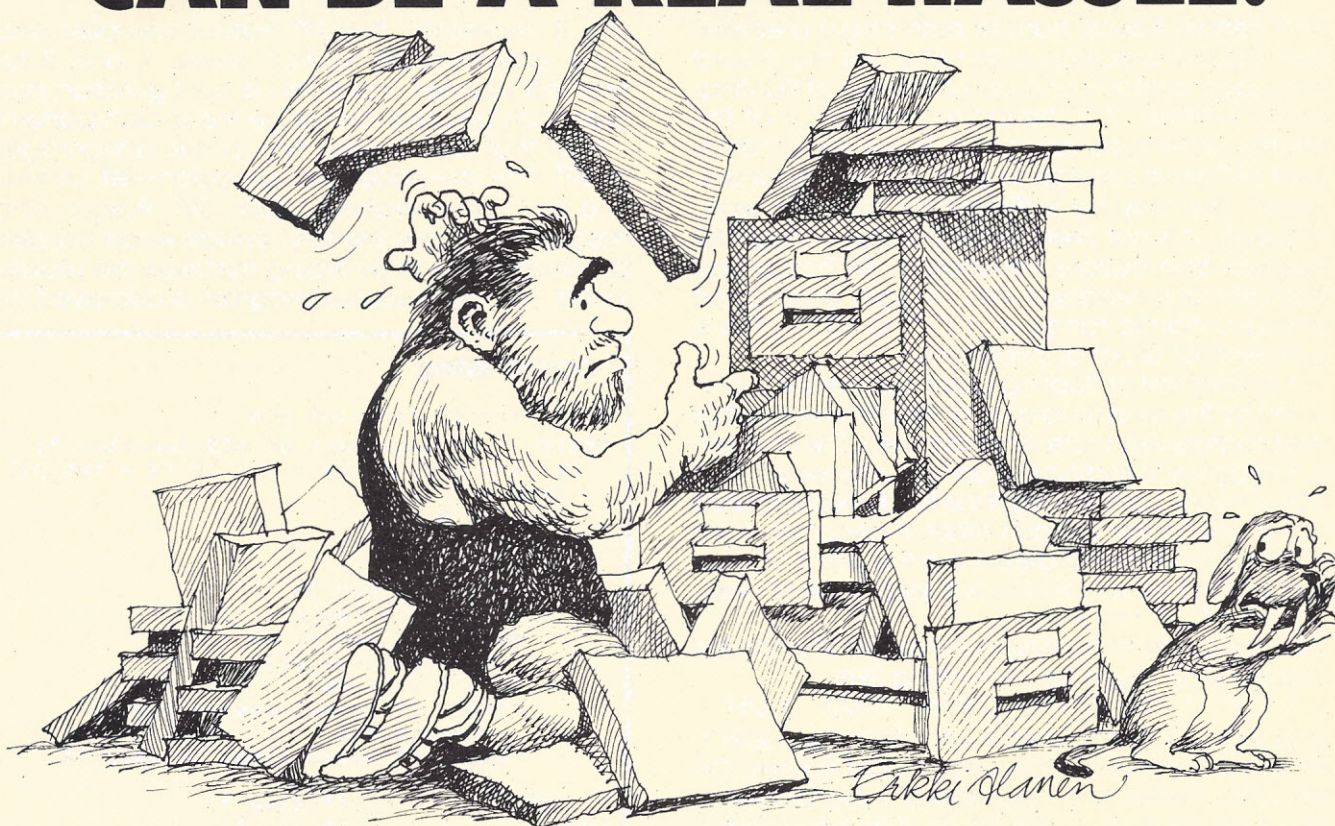
monitor. Pascal/M and JRT Pascal use this method. It appears that one of the disadvantages of the P-code approach is slower execution because of the interpretation step. However, this is not necessarily a problem.

It is well-known that compiled Basics such as CB-80 and Bascom can run as much as ten times faster than interpreted Basics such as CBasic and Basic-80 (JA Sep 82). While Basic and Pascal appear to be very different computer languages, the implementation of the floating-point routines should be similar. Consequently, the execution speeds of JRT Pascal and Pascal/M, which are both P-code interpreters, were compared to CB-80, Bascom, Basic-80 and CBasic.

The algorithms used for a speed comparison must be carefully chosen. For example, a widely published benchmark generates prime numbers. If you use a computer to balance your company books or to solve your mathematical problems, but you don't often generate prime numbers, maybe you need something besides a prime number generator for comparing the speed.

The precision of floating-point operations is likely to be an important consideration. Floating-point packages, such as those provided with Fortran

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and certain Basics, handle both single-precision and double-precision arithmetic. But the Pascal language contains only one precision of floating-point numbers. It is therefore important that this single precision be very good. Some implementations of Pascal provide six or seven figures of precision. This may be sufficient for scientific work. However, it is not likely to be precise enough for business applications. Fortunately, JRT Pascal and Pascal/M are designed with 14 digits of precision and a dynamic range of 10^{-64} to 10^{+63} . This is sufficient for usual applications.

A severe test of floating-point operations is provided by the solution to a set of Hilbert matrices that are progressively more ill-conditioned. The problem is analogous to finding the point of intersection to a pair of nearly parallel lines. If the two lines are rotated closer and closer to each other, it becomes more and more difficult to determine the point of intersection. The exact solution is a sequence of ones:

1 1 1 1 1 1

But because of floating-point roundoff error, the actual result might be something like:

1.028 1.001 0.935 0.976 1.023 1.057

for a six-by-six matrix when the floating-point operations are carried out to six significant figures. On the other hand, when arithmetic is performed to 14 figures of precision, the results of an 8-by-8 matrix are accurate to seven significant figures. The results then look like this:

1.000000 1.000000 1.000000 1.000000 1.000000

The Hilbert matrices were solved with JRT Pascal, Pascal/M, CB-80 and Bascom (with all floating-point numbers set to double precision) to compare the accuracy and speed. All of these packages have 14 digits of precision for floating-point operations. The accuracy in all cases was found to be the same (and to be very good). However, the results of the speed test are interesting.

Bascom and CB-80 were the fastest. This is to be expected, since both compile the user's source program directly into binary executable code. On the other hand, JRT Pascal and Pascal/M are P-code interpreters. Consequently, it is expected that they should run slower. Tests with the prime number generator suggest that they are considerably slower. However, in the Hilbert matrix test, JRT Pascal and Pascal/M were only slower by a factor of 2. This surprising result suggests that benchmark tests should be chosen carefully to reflect the nature of the operations you are planning to incorporate.

JRT Pascal can be run on any CP/M computer with at least 52K bytes of memory and a disk capacity of 150K bytes. Double-side, double-density disks are perfect. However, the compiler and associated routines easily fit onto a single-density, 8-in. disk or a double-density 5-in. disk. The source programs and editor for creating and altering the programs can be placed on another

disk if necessary. The JRT Pascal compiler and linker automatically search drives A and B for needed routines. However, a configuration program can be used to change the search pattern.

Now that we've seen two of the advantages of JRT Pascal—price and precision—let us look at a few more features. Both JRT Pascal and Pascal/M are user-friendly. Syntax errors caused by missing lines or by typing mistakes are readily found. The user's source program is displayed on

Program listing

```
Main Part of function SIN
BEGIN      (* main part of SIN function *)
  IF (x = 0.0) OR (x = pi) OR (x = two_pi)
  THEN
    sin := 0.0
  ELSE
    BEGIN
      WHILE x < 0.0 DO
        x := x + two_pi;
      WHILE x > two_pi DO
        x := x - two_pi;
      IF x > 1.0E-08
      THEN (* normal evaluation *)
        compute_sin
      ELSE (* value close to zero *)
        sin := x;
      END;      (* else *)
    END;      (* sin *)
```

the video screen during compiling. At this time, syntax errors are identified at each line. Compiling normally continues after each error is flagged. However, a compile-time option can be set to momentarily stop the process after each error. The user can then continue or terminate the compiling operation.

JRT Pascal incorporates an elaborate interrupt system. During any of the steps, compiling, linking or execution, the user can type a control-A. This will interrupt the process and allow the user to perform any of several tasks. One of the options is to terminate the operation. However, there are other choices that relate to debugging activity.

Standard Pascal incorporates the character variable, which can be used to define a string of characters. Unfortunately, strings defined in this way are static. That is, they have a fixed length. Each reference to such a string must include the exact full length. On the other hand, micro-computer Pascals such as Pascal/MT+, Pascal/M and JRT Pascal also incorporate a nonstandard dynamic string variable. This feature is very much like the Basic implementation. Strings can be any convenient length and the length can be changed during program execution.

JRT Pascal incorporates several built-in functions to make string operations easier. These include:

CONCAT concatenate strings

| | |
|--------|----------------------------------|
| COPY | extract a portion of a string |
| DELETE | remove a part of a string |
| INSERT | insert a substring |
| LENGTH | determine the length of a string |
| POS | find a substring in a string |

There are several other built-in functions. These are:

| | |
|--------|---------------------------------------|
| ADDR | actual address of a variable |
| FREE | show available free memory |
| HEXS | convert real or integer to hex string |
| PORTIN | input a byte from a port |
| REALS | convert a real number to string form |
| UPCASE | convert string to upper case |

Three of the more interesting built-in procedures are:

| | |
|----------|-------------------------------------|
| CALL | direct call to CP/M with parameters |
| FILLCHAR | initialize a string variable |
| PORTOUT | output a byte to a port |

The two-pass compiler places no restriction on the length of functions and procedures. By contrast, functions and procedures must be no longer than 128 bytes in Pascal/M.

When a routine, such as a sorting procedure, is needed by several main programs, it is convenient to place a single copy in a separate disk file. Then each main program can refer to the same single copy. This makes the main programs shorter and easier to comprehend. In addition, the total amount of disk space is reduced, since there does not have to be a separate copy of the routine in each program.

There are two different ways to implement this scheme. One method is the Include directive. With this approach, the Include reference is placed in the main source program at the desired location of the routine. When the compiler encounters the Include directive, it stops processing the current file and continues with the referenced file. At the end of the new file, the compiler returns to the main program. The technique is implemented in Pascal/M, UCSD Pascal, CBasic and Microsoft Basic and Fortran. The Include file is in ASCII form.

A second approach is to use separately compiled routines. JRT Pascal and Pascal/M use this method. Each separate routine is compiled independently. Then at execution time, all of the routines are linked together. There are potential problems when this technique is used with Pascal, since Pascal carefully checks the nature of parameters passed to procedures and functions. However, this checking is not performed when separ-

ately compiled routines are linked together. Thus, if the calling sequence is altered in the main program, it may be necessary to recompile the separate routine. Nevertheless, this method is inherently faster than the Include approach, since routines do not have to be compiled each time the calling program is altered.

There are several minor problems with JRT Pascal. For example, a floating-point underflow causes a fatal error, whereas other compilers will substitute the value of zero and continue execution.

A more serious problem is the strict format required for the exponent of real numbers. Most Pascals will accept any of the forms:

```
1.2E2
1.2E02   or
1.2E+02
```

However, only the last of these three forms is correctly interpreted by JRT Pascal. Unfortunately, the first and second forms are not flagged by the compiler. Therefore they will produce incorrect results.

The standard Pascal functions SQRT, SIN, COS, ARCTAN, EXP and LN are implemented as external routines. This reduces the size of the compiler. However, if any of these functions are to be referenced by a Pascal program, there must be statements such as:

```
FUNCTION SQRT(X : REAL) : REAL; EXTERNAL
```

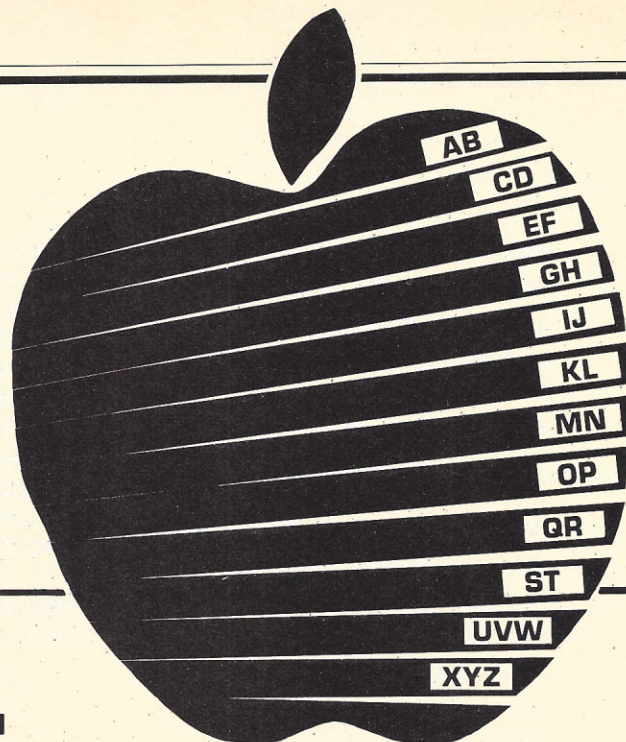
near the beginning of the main program.

There is a bug in the SIN routine that seems to be present in most of the CP/M Pascals, Basics and Fortrans. The problem appears when the argument to the sine function is close to zero. Pascal reports a floating-point underflow, even though the solutions are within the floating point range. In addition, JRT Pascal terminates execution at this point.

Fortunately, JRT Pascal is provided with the Pascal source program for the SIN function, so the bug can be easily fixed. Edit the file named SIN.PAS with your system editor. Change the last part of function SIN so it looks like the listing. Notice that there is a period at the end of the function, since it is separately compiled. Recompile the function into an INT file.

JRT Pascal is following the example set by Software Toolworks (Sherman Oaks, CA) of offering quality software at an extremely low price. It will be interesting to see if the trend continues. □

Contributing editor Alan R. Miller is a Professor at New Mexico Institute of Mining and Technology, where he has taught materials engineering, thermodynamics and programming methods since 1967. He received his Ph.D from the University of California in Berkeley. He has authored five books dealing with computer languages.



S.B.C.S. General Ledger Version 4.0

by Ron Exner

Until recently, the small business owner only had two bookkeeping choices. He had to do it himself and run the risk of spending a lot of time and effort producing reports that may not be correct. Or he could hire someone—which might not be cost-effective. In the last few years, an increasing number of computer software systems with more sophistication and user-friendliness have appeared. These are systems designed with the computer and accounting novice in mind. Such a system is the General Ledger from Small Business Computer Systems (S.B.C.S., Lincoln, NE).

S.B.C.S. General Ledger Version 4.0 requires a 48K-byte Apple II or II+, two disk drives, monitor and 80-column printer.

The system is composed of ten modules: Introduction, Data Entry, Practice Session, Setting up the Chart of Accounts, Program Modules, Error Recovery, Financial Reports, Accounting Terminology and a Glossary.

It holds up to 500 separate accounts and produces not only standard financial statements in a format designed by the user, but also a user-designed Special Report. It has two levels of security, each with its own password and each capable of allowing access to different segments of the program. S.B.C.S. allows up to nine departments and prints financial statements accordingly.

In a word, this system is *flexible*. This characteristic is most evident when printing reports. The user is given the option to print a trial balance, balance sheet or income statement utilizing current month, previous quarter, budget or year-to-date informa-

tion—with appropriate percentage breakdown. As if this weren't enough, you are also allowed to format your own special report, utilizing whatever accounts you wish in whatever report format you find meaningful.

All this flexibility is not without a trade-off. For example, there are only two main modes of data entry: Transaction Entry and Journal Entry. Transaction Entry is used to record expenses and receipts while Journal Entry acts as a General Journal to record entries that do not relate to Transaction Entry. This sounds adequate, but there are two drawbacks.

First, the Transaction Entry input format is awkward, confusing and produces a barely adequate audit trail with no meaningful reporting possibilities other than an all-inclusive Income or Expense Transactions Report or the usual formal financial statements. For example, when making entries from a check register, there is no place (other than the description field) for the check number and no way to produce a cash disbursement report or a purchases report—or any other special report.

There is no easy way to separate current from accrued items. Either they are mixed in the Transactions Journal, which means there is no way to separate the two, or they may be separated by putting the current items in the Transactions Journal and making the accrued entries through the (general) Journal. The same would be done for the income and non-cash items, so the net effect would be that expenses and revenues may be segregated into current and accrued, but the accrued would

be mixed with all other General Journal entries.

Confused by all this? Then you understand what it is like in trying to organize your entries to fit the two input modes allowed.

Second, the Journal Entry section causes unnecessary repetition. The process for a simple journal entry is: 1) provide the G/L account number; 2) input the date; 3) put the amount in the proper debit or credit column; 4) enter the description; 5) press <return> if no changes...; 6) press <return> to record, and 7) go to #1 and repeat the process for the other half of the entry. Not only is this process a waste of the operator's time, but for each human entry, there is an increasing chance for making an error and thereby wasting more time in making corrections. We must remember that one of the prime reasons for investing in a computerized accounting system is to get away from a laborious and error-prone manual system—not change over to a time-consuming, complicated and inaccurate computer system.

Even if the inefficiencies of the input routines are excluded, this system seems unnecessarily complicated. For example, instead of a simple one-step posting routine that would transfer income, expense and journal amounts to the chart of accounts (General Ledger) and a simple closing routine that would reset expense and income accounts to zero, there is a procedure stating: "Entries can be closed using three different modules. Journal Entry will close only Journal Entries, Transaction Entry will close only Transaction Entries and Update Entries can be used to close all entries. However, if you are closing entries and then want to make more postings before updating, you must use Journal Entry and/or Transaction Entry to close your entries."

Wrapped in a glossy three-ring binder, the 274 pages of documentation are well-organized and well-written. This is an improvement over the previous versions, which relied heavily on the very technical Osborne manual. Complete with glossary, index and table of contents, the manual is divided into two basic parts: tutorial and reference. This is a logical and convenient way to make necessary information available to the user.

Frequent access to the documentation was necessary because—from an accounting standpoint—the design of the program seemed so foreign. There were times when even the documentation seemed confusing. For example, concerning closing..."in order to close your entries and move them to the Adjustment File where they can be updated, you will need a current Backup data disk. Once entries are closed, the Backup disk will no longer be current. If you have closed any entries before using Update Entries, you will need to make a current backup disk."

Common accounting terms—as opposed to

programming jargon—could have been used more extensively. Beyond this drawback, the documentation is written in a style punctuated with humor—oriented toward being user-friendly.

Operating this program is somewhat analogous to an American driving a car in England. The underlying principles are similar, but if you have never driven on the left side of the road, it takes some getting used to. This is partly because of the design of the input routine and partly because of the terminology used in the documentation.

During the tutorial, for example, I sometimes became confused and unable to relate what was going on with the standard accounting cycle. However, after completing the reference section, I was—with some difficulty—able to adjust my understanding of the accounting cycle to accommodate the program.

Error-handling capability is outstanding. Short of turning off the computer when it is writing to the data disk, there is no way to bomb a disk. To emphasize this point, the manual's tutorial section instructs the user to simulate different "accidents" that might befall a user.

The package arrives with two program disks and one sample data disk. The program is copy-protected. However, the company offers the following warranty to the original purchaser: "...to be free from defects—for as long as you own the program. In addition to free replacement of damaged disks, the original purchaser can obtain available program updates free of charge by returning their original program disks..." In addition, both the program designer and his staff seemed extremely open, helpful and available for consultation when needed.

From a *programming* standpoint, the general ledger system works very well and is quite impressive. This is especially so if you consider that the entire program resides on a single disk. From an *accounting* perspective, the system is clumsy, overly-complicated and unsophisticated. It has no provision for special journals, such as Cash Receipts, Purchases, Sales, etc. Consequently, it requires the user to conform his data and thinking to the system instead of allowing the system to conform to the user.

If you have a special or unusual accounting need and require a great deal of flexibility, you will find the trade-off of *easy set-up and input* for *flexibility* worthwhile. The system can produce some outstanding reports.

Ron Exner is a professional accountant and small business consultant, residing in Bellingham, WA. He has worked as a cost accountant and stockbroker. In recent years, he has combined his accounting activities with the benefits of computerization.

Control: A Relational Database Access System

by James H. Wilbanks, Ph.D.



The ability to use plain English to ask for and receive information from microcomputers is a rarity among the many data management programs now available. Now, computer users can do just that—and more—using Control, the relational database access system, written by Quaydata and distributed by Phase One Systems (Oakland, CA).

Using Control, the user might ask the computer "how many parts do I have in stock that cost more than \$100? I also need the part numbers and locations." Designed to operate with Z80 microcomputers running under Phase One's Oasis operating system, Control's access feature allows conversational requests to be entered with amazing ease. The package provides a powerful, yet user-friendly system for creating, modifying and using a complex database system.

What makes Control unique? Consider the three basics for choosing a database management system: Can information be retrieved swiftly and easily? Can it be entered easily? Can the system be maintained effectively? The Control package facilitates all three. For example, it requires no programming. Instead, the system allows the operator to use the computer console to design a screen mask. This mask is the foundation for providing information to the database. The operator follows the guides given to design his input. Several modules provide for the programless nature of Control, and when taken together, generate a screen and file maintenance program resulting in a compiled, complete and fast-running applications program. Control frees the computer operator from writing a Basic program—saving time and testing.

124 INTERFACE AGE

In order to generate even the simplest program, the following modules must be used: SCREEN, SETUP and EXPAND. Other modules such as INVOKE, DOCUMENT and VCOMP may be used if needed.

The SCREEN module, as the name implies, allows the operator to define data input through the screen mask. This mask defines what information is to be provided to guide the operator as data is input. It also specifies where the information will appear on the computer video screen. The operator can determine what error messages should be displayed if an incorrect data addition is attempted. The SCREEN module puts all this right on the video screen.

After the screen mask has been defined, the SETUP module is used. SETUP's purpose is to tell the computer the name of the operator's database; management manipulations are accomplished from the console using the screen mask defined in the SCREEN module. Data may be entered or deleted, modified or filed.

Other program modules in Control allow the user to test a screen layout (INVOKE) without actually adding any data and to output a printed copy of the screen design (DOCUMENT).

A distinguishing feature of the system is the ACCESS module of Control. Using ACCESS, the operator can ask for information using conversational English sentences. The computer, of course, must have a way of understanding the words that comprise these sentences. The Quaydata pro-

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JOB FUNCTIONS(S)

AREAS OF MAIN PRODUCT INTEREST

grammers have given Control its own built-in vocabulary. When a user sets up a database, words unfamiliar to the computer can be added to the computer's language store using the VCOMP module. This module provides an easy way of adding words to Control's dictionary. An advantage of using this arrangement is that it allows for a variety of reporting formats. These formats can be requested using ACCESS sentences.

ACCESS sentences may seem awkward at first glance: [verb—file description—selection specification(s)—sort specification(s)—output specification]. Common speech does not normally begin with a verb. Think of the ACCESS sentence as an imperative (command) sentence of the type, "Go get the ball and bring it to me." Then the structure makes sense. ACCESS uses four verbs to retrieve information from the database. These include LIST, SORT, SELECT, and SSELECT. These verbs can be thought of as commands.

LIST, probably the most used command, allows information to be output to the console or printer. LIST uses the current sequence of information contained in the database. Any information that meets the selection criteria will be provided. No sorting or ordering of information is done. SORT allows information to be presented in any order desired. SELECT works like the LIST command. A major difference is that the output is to disk file rather than to console or printer. SSELECT combines the features of both SORT and SELECT. Output is to a disk file.

Many combinations of ACCESS sentences are possible. A sentence may be no longer than 1,024 characters and may refer to as many as 32 data categories (attributes). A sentence can sum up to 16 numeric attributes. If you accidentally ask for a total on non-numeric attributes, the program will not crash. It just gives a zero total. For purposes of clarification, typical ACCESS sentences follow.

LIST THE PROGRAM FILE TYPE ALL PART NUMBERS,
QUANTITY, COST AND SELLING PRICE.

This sentence causes the number, cost and selling price of all part numbers in the PROGRAM database to be displayed on the video screen. No sorting or ordering is provided.

PLEASE SORT THE INVENTORY FILE BY PART NUMBER
PRINT PART NUMBER, QUANTITY, COST, SELLING PRICE
TOTAL QUANTITY.

This sentence provides sorted information. Part numbers are provided in ascending order, and the information is printed. The numbers of all parts are summed.

Of course, Control does not recognize all English words. But the designers have made a thoughtful effort to make ACCESS sentences as English-like as possible, even providing words that are

ignored by the computer to make the sentences more readable.

In addition to generating programs and plain English requests for information, Control differs from other database managers in that it allows output of information not actually held in the database. Relational definitions among data categories may be used. When these relationships are listed in Control's vocabulary, they can be used as if contained in the database. An example would be to define a correlative attribute, by combining quantity multiplied by cost, named Extension. The attribute could be used just like any other data attribute even though it does not exist as a part of the database. Much more complex relationships

Control differs from other database managers...it allows output of information not actually held in the database.

can be defined. Using these correlative relationships, very powerful relational capabilities can be obtained from the Control package.

One caution is in order: This package is not for use on a minimal memory system. A two disk drive system is a must. For backup ease, a three-disk system is desirable. If large amounts of data are to be managed, hard disk should be considered.

Control is a sophisticated relational database access program designed for Oasis. It enables expedient programming—eliminating hours of keyboard code entry. It features English inquiry to generate many different reports. When a new relationship among the data categories is required, new programming is generally not necessary. Correlational attributes may be defined and used instead. The documentation provided by Phase One is comprehensive—albeit lacking in examples. For those who operate their Z80 based systems with Oasis (single user or multiuser), Control is a database package worthy of consideration.

James H. Wilbanks is Radiological Defense Officer for the Georgia Emergency Management Agency. He works with a TRS-80 Model II for a variety of office and scientific applications.

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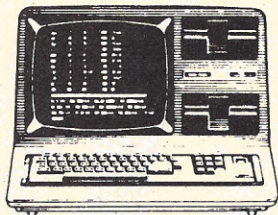
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| 1 | 16 | 31 | 46 | 61 | 76 | 91 | 106 | 121 | 136 | 151 | 166 | 181 | 196 | 211 | 226 | 241 | 256 | 271 | 286 | 301 | 316 | 331 |
| 2 | 17 | 32 | 47 | 62 | 77 | 92 | 107 | 122 | 137 | 152 | 167 | 182 | 197 | 212 | 227 | 242 | 257 | 272 | 287 | 302 | 317 | 332 |
| 3 | 18 | 33 | 48 | 63 | 78 | 93 | 108 | 123 | 138 | 153 | 168 | 183 | 198 | 213 | 228 | 243 | 258 | 273 | 288 | 303 | 318 | 333 |
| 4 | 19 | 34 | 49 | 64 | 79 | 94 | 109 | 124 | 139 | 154 | 169 | 184 | 199 | 214 | 229 | 244 | 259 | 274 | 289 | 304 | 319 | 334 |
| 5 | 20 | 35 | 50 | 65 | 80 | 95 | 110 | 125 | 140 | 155 | 170 | 185 | 200 | 215 | 230 | 245 | 260 | 275 | 290 | 305 | 320 | 335 |
| 6 | 21 | 36 | 51 | 66 | 81 | 96 | 111 | 126 | 141 | 156 | 171 | 186 | 201 | 216 | 231 | 246 | 261 | 276 | 291 | 306 | 321 | 336 |
| 7 | 22 | 37 | 52 | 67 | 82 | 97 | 112 | 127 | 142 | 157 | 172 | 187 | 202 | 217 | 232 | 247 | 262 | 277 | 292 | 307 | 322 | 337 |
| 8 | 23 | 38 | 53 | 68 | 83 | 98 | 113 | 128 | 143 | 158 | 173 | 188 | 203 | 218 | 233 | 248 | 263 | 278 | 293 | 308 | 323 | 338 |
| 9 | 24 | 39 | 54 | 69 | 84 | 99 | 114 | 129 | 144 | 159 | 174 | 189 | 204 | 219 | 234 | 249 | 264 | 279 | 294 | 309 | 324 | 339 |
| 10 | 25 | 40 | 55 | 70 | 85 | 100 | 115 | 130 | 145 | 160 | 175 | 190 | 205 | 220 | 235 | 250 | 265 | 280 | 295 | 310 | 325 | 340 |
| 11 | 26 | 41 | 56 | 71 | 86 | 101 | 116 | 131 | 146 | 161 | 176 | 191 | 206 | 221 | 236 | 251 | 266 | 281 | 296 | 311 | 326 | 341 |
| 12 | 27 | 42 | 57 | 72 | 87 | 102 | 117 | 132 | 147 | 162 | 177 | 192 | 207 | 222 | 237 | 252 | 267 | 282 | 297 | 312 | 327 | 342 |
| 13 | 28 | 43 | 58 | 73 | 88 | 103 | 118 | 133 | 148 | 163 | 178 | 193 | 208 | 223 | 238 | 253 | 268 | 283 | 298 | 313 | 328 | 343 |
| 14 | 29 | 44 | 59 | 74 | 89 | 104 | 119 | 134 | 149 | 164 | 179 | 194 | 209 | 224 | 239 | 254 | 269 | 284 | 299 | 314 | 329 | 344 |
| 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 |

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BUSINESS SOFTWARE

Real estate analysis

Business Management IV is a complete system for performing sensitivity studies on real estate investments. The system can analyze before-tax and after-tax cash flows based upon many factors. It is available on an 8-in. diskette for the TRS-80 Model II with 64K bytes in TRSDOS 2.0A or CP/M. Century Software Systems, Los Angeles, CA.

CIRCLE INQUIRY NO. 150

Accounting program for MP/M

Business Software Series includes Inventory Control for Manufacturers, Job Cost Control, General Ledger, Accounts Receivable, Accounts Payable and Retail/Wholesale Inventory. The packages run under the MP/M-I or MP/M-II operating systems and allow true multi-user access: different users may access and update the same data files simultaneously. It incorporates a record-locking scheme, which prevents users from interfering with one another. Written in PL/I-80, the series uses Digital Research's Access Manager utility for file handling (including record-locking). A B-Tree index is maintained for all large data files. In addition, portions of the index are buffered in memory. Microcomputer Consultants, Davis, CA.

CIRCLE INQUIRY NO. 151

File directory recovery package

Filefix is a program for recovering erased files, protecting, deleting and renaming files, as well as forging multiple user links to a single CP/M file. You may: view the CP/M directory block allocation map; display files in short form; display files in long form with block and sector status; and display a disk's status completely.

128 INTERFACE AGE

Digital Marketing, Walnut Creek, CA.

CIRCLE INQUIRY NO. 152

Three packages for IBM PC

Star Computer Systems offers an integrated accounting system, a legal timekeeping and billing program and a property management software package. Four modules included in the integrated accounting program can also run as independent programs. These consist of a general ledger, accounts receivable, accounts payable and payroll. All of the software packages are programmed in CBasic-2 except the legal timekeeping and billing program that is written in MBasic-80. The six programs can also operate on any CP/M or MP/M based microcomputer. Star Computer Systems, Torrance, CA.

CIRCLE INQUIRY NO. 153

Accounting applications

The Control Data Financial System includes accounts receivable with billing and sales analysis, accounts payable, general ledger, inventory, payroll, job cost and sales order processing designed for small business utilization. They are designed for use with the Control Data 110 microcomputer. Open Systems, Inc., Minneapolis, MN.

CIRCLE INQUIRY NO. 154

Personal productivity tool

The Organizer provides a range of functions including a notepad editor, a filing system with rolling indexes, an alarm clock, a programmable calculator, and an appointment calendar. In addition, the program handles tasks normally assigned to an operating system, such as maintenance of directories, formatting

I/O and mass storage devices, and error detection and recovery. It runs on an Apple II with two disk drives and 64K bytes of memory. Conceptual Instruments, Philadelphia, PA.

CIRCLE INQUIRY NO. 155

Inventory cost control

The Execuware Economic Order Quantity package is available for use with Apple II, Apple II Plus and IBM. It allows the user to perform "what-if" analysis to find savings on high cost or large volume items and determines if vendor discount schemes are good. It helps identify inventory problems and calculate aspects of ordering. Aeronca Inc., Charlotte, NC.

CIRCLE INQUIRY NO. 156

Software for portability

Field Companion is a stand-alone software package for traveling professionals. Designed specifically for portable computers, it performs expense accounting and maintains appointments as well as current customer lists with ship-to and bill-to addresses. The invoicing feature retrieves required data from both customer and product lists, eliminating errors in order processing. Invoice copies may be output to a printer; or with a modem, orders may be transferred to the home office in seconds. It requires CP/M and 56K bytes of RAM. Version for CP/M86 requires 128K of RAM. Digital Marketing, Walnut Creek, CA.

CIRCLE INQUIRY NO. 157

Shipping industry program

The Shipper, a Cargo Manifest System is designed to run on the IBM System 34. Functions include: Entry, Matching, Tariff, Forms and Reports. Syscom Inc., Miami, FL.

CIRCLE INQUIRY NO. 158

OCTOBER 1982

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| Numeric Keypad by Keyboard Co. | \$139.00 |
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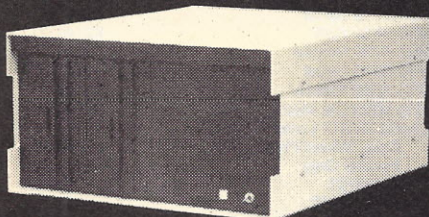
INTERFACE AGE 129

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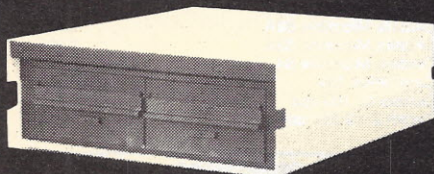
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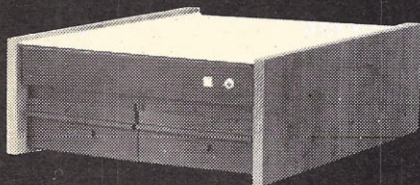
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130 INTERFACE AGE

Programmable spreadsheet for IBM PC

EasyPlanner gives the user the ability to divide a planning task into segments and to devote a spreadsheet to each. Data from subordinate sheets may then be automatically entered into a master spreadsheet—and/or any other spreadsheets on the disk. Whoever creates the spreadsheet can program it to follow an automatic sequence of work steps from loading the sheet to printout. Then, an operator simply follows prompts to enter fresh data and print an updated spreadsheet. Programmed spreadsheets enable a businessperson to collect uniformly organized data from many employees. Information Unlimited Software, Sausalito, CA.

CIRCLE INQUIRY NO. 159

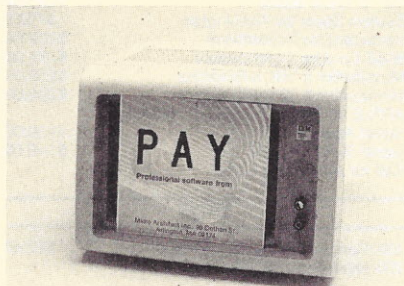
Retail sales program

Point-of-Sale, inventory management and Mail-Base comprise an integrated package. In combination with an electronic cash drawer, it can replace the typical point-of-sale terminal with a microcomputer, allowing for the efficient one-time entry of information at the point of sale to update inventory, sales history, customer database and accounting—as well as producing sales invoices and reports. Depending upon the hardware configuration, single or multiple terminal operation may be supported. It is available for operation on TeleVideo, Zenith, or any CP/M based CPU with a TeleVideo or Zenith video terminal attached. XtraSoft, Louisville, KY.

CIRCLE INQUIRY NO. 160

Payroll system for IBM PC

PR-I requires IBM DOS, a 132-column printer, monochrome display, a dual disk system and 64K-byte memory. It calculates payroll for each employee, while maintaining monthly, quarterly and yearly totals for reporting purposes in multiple states. Tax



tables are maintained by the users via on-line commands with no programming required. Output includes paychecks, 941s, W-2 forms, paycheck register, monthly summary, G/L transactions register, employee file list, etc. Micro Architect, Arlington, MA

CIRCLE INQUIRY NO. 161

Financial modeling program

DollarTrak VIII is designed to the 13-column-by-26-line standard columnar pad, which accommodates 12 months plus totals. It allows the user to have additional pages that interact to each other, and is limited only by the size of disk memory space. Various models can be constructed using the same database. The program operates under CP/M and MP/M. It is furnished on 8-in. single density media. Software Automation, Laguna Hills, CA.

CIRCLE INQUIRY NO. 162

Integrated financial service program

The system is comprised of North Star hardware and selected Omni accounting software. The software is made up of two parts: the CPA program itself, which generates general ledger, balance sheet, statement of income, chart of accounts listing, payroll journal with payroll tax summary, comparative financial statements, trial balance and statement of changes, and the 1040 Tax Package, which produces the federal and state tax returns, prints out the final forms for filing. All information is saved on disk for following year proformas. Omni Software Systems, Griffith, IN.

CIRCLE INQUIRY NO. 163

Text file conversion to VisiCalc

LoadCalc can move data from Dow-Jones, The Source, Compuserc and other mainframe reports to VisiCalc. Files can be captured with communication programs such as VisiTerm or R/NET, then loaded into VisiTrend/Plot or VisiCalc. Some of the sources are: timesharing systems, other personal computers, data from software packages that do not produce DIF files but save data to disk as text files. Cypher, San Francisco, CA.

CIRCLE INQUIRY NO. 164

Color inventory package

ColorBiz is an inventory program that features database retrieval capability, selective scanning, charting, reporting, error checking, password security, single key responses, and user definable keys. Defined reports include: on order/recommendation, master parts listing, inventory analysis, physical inventory and stock status. Color Corp., Bloomfield Hills, MI.

CIRCLE INQUIRY NO. 165

Records processing for Sony

Version 3.0 enhances the basic text editing capabilities of the Series 35 word processor. In addition to tasks such as sort, select and list merge, it permits "direct print," which enables the hardware to be used as a typewriter, going directly from the keyboard to the paper in the printer. The 3.0 software will be offered at no additional cost to current and future Series 35 customers. The package also has a pattern matching feature, allowing contextual search and retrieval. Sony Corporation of America, Park Ridge, NJ.

CIRCLE INQUIRY NO. 166

OCTOBER 1982

ATTENTION: ATTORNEYS

Make your Word Processor more productive!

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Itemized bills ready to mail
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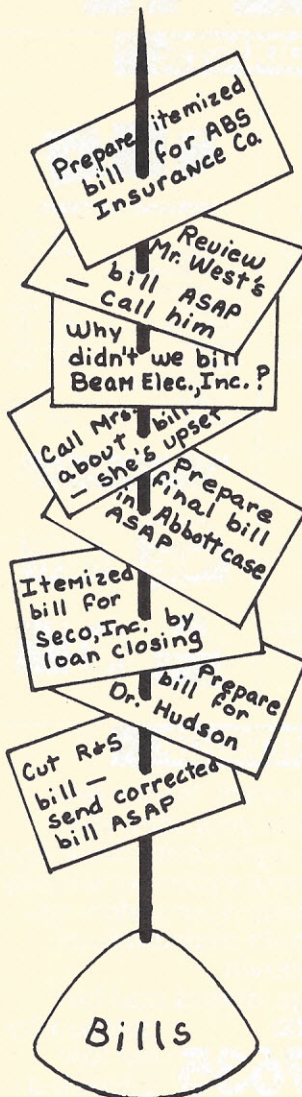
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The Integrated Business Information System is a comprehensive set of accounting packages designed for the Rainbow, DECmate II and Professional Series. All dialogue is interactive and controlled by simple, multiple choice menus. It generates user-defined financial statements and more than 25 printed reports for use in financial analysis and planning. PDS MicroSystems, Carson, CA.

CIRCLE INQUIRY NO. 167

Financial system for TRS-80

Securities Trading Access & Recording (STAR) is written in RSBASIC and runs under TRSDOS, DOSPLUS or other compatible operating systems. It supports floppy and Winchester disk drives and is available as single or multi user. The system provides for recording trades for multiple clients, inquiries by client, cross reference inquiry by security symbol, profit and loss inquiry, and reporting such as profit and loss statements, long term conversion alert, options expiration alert, position reports, mailing labels, etc. Morningstar Technology, Greenville, SC.

CIRCLE INQUIRY NO. 168

Graphing package

Andover Controls' AC256 Energy Management and Control System combines distributed processing, full user programmability and direct digital control capabilities. The new software enhances the documentation features by allowing users to graph recorded information. A typical plot might include engineering department temperature vs. outside air temperature vs. cafeteria temperature during the last 32 hours, or the relative humidity in a specified area. Andover Controls, Andover, MA.

CIRCLE INQUIRY NO. 169

Versatile UNIX package

Handle is a word processor/database system that is portable between different hardware architectures, thus facilitating networking. Fernware, Houston, TX.

CIRCLE INQUIRY NO. 170

BUSINESS SYSTEMS

Portable with advanced features

HP-75C measures only 10 in.-by-5 in.-by-1 1/4 in., weighs 26 ounces, runs on batteries and retains programs and data when turned off. It features capabilities of larger, more expensive computers, including Basic language programming power, interfacing and software. The CPU is a version of the 8-bit custom processor in the Series 80 personal computers. There are 16K bytes of RAM; this can be increased to 24K bytes. Touch-typing is possible and every key can be redefined by the owner for specific applications, and the redefined keys can be given new labels by snapping

OCTOBER 1982

on keyboard overlays. A 32-character, liquid-crystal display serves as a movable window on a 96-character line and features



character descenders. One type of off-line mass storage is integrated—a hand-pulled magnetic-card reader, through which cards containing programs or data are pulled, reads or writes up to 1.3K bytes per card. Multiple files that can interact are an important part of the computer's capabilities. Program files, data files and appointment files can be named, saved in RAM and programmed to interact with each other. Hewlett Packard, Palo Alto, CA.

CIRCLE INQUIRY NO. 171

Mid-range office automation

Simplifier is a new low-cost word and data processing system. The video display may be tilted and rotated and the keyboard is detachable. Additional ergonomic features include oversized characters. It can be user-programmed in Basic or, optionally, can operate with the CP/M operating system. It is available in two versions, Simplifier 12 and Simplifier 40. Both include 64K-byte memory, a 12-in. 24-by-80 video display with tilting and rotating mechanism, detached keyboard, one 5¼-in. 160K-byte capacity disk drive, an RS-232 serial port, and a letter quality daisywheel printer. The 12 is supplied with a simpler printer, which features drop-in ribbons and snap-on daisywheels in a variety of 10-pitch type styles. The 40 offers a greater variety of type styles in 10, 12, and 15 pitch and proportional fonts. Options include a tractor feed, a dual bin sheet feeder and a second dual bin sheet feeder with a built-in envelope feeder. Compucorp., Santa Monica, CA.

CIRCLE INQUIRY NO. 172

High-capacity desktop processor

Model 686 provides 15 to 45 million characters of Winchester disk storage, which equates to 7,500-22,500 pages of single-spaced typewritten text. It includes a high speed processor, 64K-byte memory, 12-in. 20-by-80 video display, a serial RS-232 port, keyboard, one 15-million character Winchester disk and a 655K diskette. Compucorp., Santa Monica, CA.

CIRCLE INQUIRY NO. 173

OCTOBER 1982

Compact workstation

Unistar 100 is a compact desktop version of Bell Labs' UNIX operating system running on the 32-bit 68000 microprocessor. Hardware consists of the Callan CD100M Multibus-compatible workstation with 5¼-in. Winchester and floppy drives, green phosphorus CRT and detached keyboard. The system comes with C and 68000 ASM, for example, and optional languages



include Pascal, Cobol, APL, ADA, Fortran 77 and Basic. The system's text-processing facilities include a document formatter, spelling program and full-screen editor. Callan Data Systems, Westlake Village, CA.

CIRCLE INQUIRY NO. 174

High-capacity micro

Sage II is a 68000-based single board system. It contains between 128 and 512K bytes of parity RAM memory and up to 1.3M bytes of 5¼-in. floppy disk storage. It is able to execute two million register-to-register additions per second and



requires just over ½ cubic foot of space. For communications, the system contains two RS-232C serial ports, one Centronics-compatible parallel port and an IEEE-488 interface. Sage Computer Technology, Reno, NV.

CIRCLE INQUIRY NO. 175

Complete Apple III for business

Professional Solution combines into one package an Apple III with 256K bytes of internal memory and a built-in floppy disk drive; a 12-in. Monitor III; software for word processing, financial modeling and data management; and specially designed training aids. This desktop computer system has sufficient memory capacity and



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versatility to handle the application needs of managers, business owners, doctors, lawyers and architects. Product training tutorials for Apple Writer III, VisiCalc III, Quick File III, as well as the System Utilities disk are also included in the package. Apple Computer, Cupertino, CA.

CIRCLE INQUIRY NO. 176

Inexpensive desktop unit

The C-10 Super Pak has a 12-in. green phosphor graphics display, a double-sided, double-density disk drive, a detachable keyboard, an RS-232 serial port, a parallel port, and an RS-232 modem port. Software packages include a CP/M compatible operating system, Structured Basic as its high-level language, a complete word



processing package and a spreadsheet. It has features found on higher-priced machines, such as a full 25 line by 80 character CRT. Cromemco, Mountain View, CA.

CIRCLE INQUIRY NO. 177

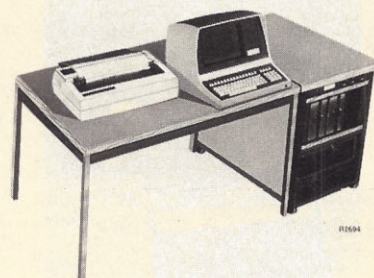
Auxiliary workstation

Model 8721 features separate video display and keyboard units joined by a coiled cable. This configuration permits the user to arrange both units on a desktop or place the video display at eye level above the work area. In addition, the tilt of the screen may be adjusted. The 12-in. diagonal screen, designed with green phosphor to minimize glare and eye fatigue, holds 1920 characters in a 24-line by 80-character format. Operational status is displayed every 25th line. It can be used with any Durango computer equipped for multiple operators. The workstation recognizes a common set of international character set options, graphic symbols and control codes used by Durango computers. Applications executed at either the computer console or workstation result in identical visual output on the screen. The workstation connects to the computer through the multiport serial interface option. For distances up to 100 feet, the Model 8721 can be directly interfaced. At greater distances, the workstation uses full duplex modems. Durango Systems, San Jose, CA.

CIRCLE INQUIRY NO. 178

Simplified reporting for Building management system

DataManager can be used to selectively



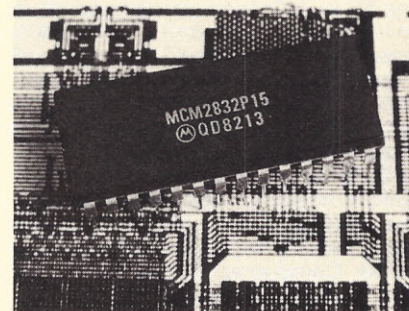
retrieve building performance data stored over a period of days, months or even years. It combines mass storage with an independent processor to make it capable of distributed processing. Using the self-instruction CRT, a user can select from a menu of available report formats. Then, once retrieval criteria are keyed in, specific information is automatically processed, thus eliminating the search through hardcopy logs for historical data needed in an investigation. Honeywell, Minneapolis, MN.

CIRCLE INQUIRY NO. 179

CPU/MEMORY

High density programmable ROM

MCM2832 is a 32,768-bit Electrically Erasable Programmable Read Only Memory (E²PROM). It is designed for handling data in applications requiring both nonvolatile memory and in-system reprogramming. The device operates from a



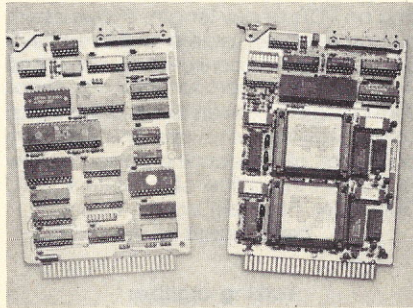
single +5V power supply in the read mode, while writing and erasing are accomplished by providing an additional unclocked +21V supply. Word erase and write can be controlled entirely by TTL signal levels. Motorola, Austin, TX.

CIRCLE INQUIRY NO. 180

Bubble-memory for STD-bus micros

Expandable magnetic-bubble mass-storage memory system for STD-bus microcomputer systems will provide more storage than a

double-density floppy-disk system, and require no extra chassis or power supply. It is comprised of a single-board controller



module (designated the PBC-1 Bubbl-Control) and one or more bubble-memory storage modules (designated PBB-1 Bubbl-Board). The bubble-memory system is compatible with all STD-bus systems that employ either Z80- or 8085-based CPU modules. Bubbl-Tec, Dublin, CA.

CIRCLE INQUIRY NO. 181

Graphics board

Graphics 810 series of plug-in conversion boards for Texas Instruments 810 RO printer, the Model 195 makes possible simplified generation and repetitive forms, label and barcode printing. Simple commands provide printing of variable size characters from 0.1-to-10 in., which can be oriented vertically, sideways or upside down on the paper. On-board programs simplify barcode printing as it will automatically calculate check sums, append start-stop characters and print the selected barcode based on a short command. Forms and labels can be created, then repetitively printed with no further assistance from the host processor. Forms can be printed with fixed and variable data fields. The variable data fields can be incremented or decremented and the user's processor can fill in fields as each form is printed. Analog Technology Irwindale, CA.

CIRCLE INQUIRY NO. 182

GRAPHICS

Protocol converter

A graphics option offered with the PCI 1076, an ASCII to SNA/SDLC protocol converter enables ASCII graphics terminals to communicate on IBM's SNA/SDLC (System Network Architecture/Synchronous Data Link Control) lines. This allows non-IBM graphics terminals to function with full-screen, full color or black and white capability in an IBM SNA network. PCI 1076 graphics support extends to three resolutions from Tektronix—4112, 4014 and 4027; and the 6212T from Ramtek. Graphics software packages supported by the PCI 1076 are: SAS/GRAPH from SAS Institute, TELL-A-GRAF from ISSCO (Integrated

Software System Corporation), and Plot 10 from Tektronics. The PCI 1076 functions within IBM's SNA/SDLC network by replacing the IBM 3274/76 controllers. It can be placed anywhere in the configuration where the controller might appear. Within the network, ASCII graphics devices, when attached to the PCI 1076, function as IBM 3278 CRTs. Protocol Computers, Woodland Hills, CA.

CIRCLE INQUIRY NO. 183

Color business system

The AX stand-alone system provides "What if?" situational analysis for decision-making, or can be used to create design graphics for presentations and reports. A basic single-user system including software consists of a 512-by-512 line color terminal, a monochrome terminal, a graphics editing tablet and a microprocessor with 21M-byte hard disk. Options include additional user stations and alternate color terminals with higher resolutions or management review monitors. A variety of output media is available, including color paper copies, plotter output, slides, transparencies, microfiche. Apache Electronic Systems, Oak Brook, IL.

CIRCLE INQUIRY NO. 184

Character redefinition

Graphics +Plus module for the Apple II mates with the Lower Case +Plus (and Lower Case +Plus II) to give the user a RAM-based character set. Although the Graphics +Plus lets you define any character you can fit in a 7-by-8 cell. No use of the Hires graphics page is made! Since one only manipulates the 960 bytes of data on the text page instead of the 8K bytes on the hi-res graphics page, less than one-eighth the work is required to manipulate the graphics characters on the screen. Included with the Graphics +Plus are over 20 example fonts, a font editor, several utility programs and example files. Both Pascal and DOS 3.3 software are provided on diskette. Lazer Microsystems, Corona, CA.

CIRCLE INQUIRY NO. 185

Sketching device

Fig Factory for the Apple III Computer is a hi-res graphic utility for on-screen sketching. You can sketch, then store up to 102 symbols or figures, and up to five pictures on each diskette for retrieval. The disk-base utility program is designed for the Apple III computer and requires the 128K-1 external disk drive—with joystick and Silentyte Printer optional. Sun Software, Tustin, CA.

CIRCLE INQUIRY NO. 186

MISCELLANEOUS

Color video monitor

Color II-A video monitor features 560 (H) by 240 (V) line resolution, 80-by-24 character display capability with R.G.B. analog

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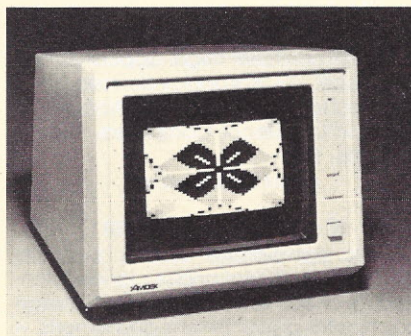


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input compatibility for up to 4096 computer-controlled color variations. It is compatible with Apple III and IBM Personal and Busi-



ness Computers. It has an in-line, high resolution 13-in. CRT plus a deflection yoke and transformerless power supply. User controls include contrast and brightness and a BNC input connector is provided. Amdek Corp., Arlington Heights, IL.

CIRCLE INQUIRY NO. 187

Data communications for Osborne

Ozmosis is designed to transfer both text and binary files to or from the Osborne and another CP/M-based computer. The program does not require knowledge of assembly language programming to install or operate. It includes full menu prompting, autostart/stop and error recovery routines. These automated features provide maximum efficiency and convenience while performing file transfer operations. It also works with modems and includes a remote terminal routine for using the Osborne as a stand-in terminal for the other computer. Acquis Data, Irvine, CA.

CIRCLE INQUIRY NO. 188

Job cost timekeeper

Timer is used for computer-based job costing and estimating systems. The daily time report is cross-checked for accuracy, ensuring data quality and revealing errors before entry. Off-line—and operated by the worker—there is a unit at each workstation. Chargeable and non-chargeable time are easily separated. System is compatible with any software using elapsed time values in hundredth of hours or minutes. Timer Systems, Woodland Hills, CA.

CIRCLE INQUIRY NO. 189

Data access method

TFC ISAM (Index Sequential Access Method) package for the Affinity 16 includes: duplicate keys, capacity utilization specification and a variable number of buffers. Also available are utilities menu-driven by function keys, such as easy backup and restore, reorganization and file status, and specifications display. TRW-Fujitsu, Los Angeles, CA.

CIRCLE INQUIRY NO. 190

Instruction package for CP/M, MP/M

Co-pilot allows the user to perform com-

puter command by responding either to multiple choice questions or in essay form. It works on terminals with 40-, 52-, 64-, 80- and 132-character column widths and on VDTs of any length, allows use of a console's insert, delete and directional arrows rather than control-code sequences. At any point in operation, one can switch from categoric answers to sets of instruction or to essay-form answers. This program can be an aid in teaching personnel how to work in the office of the future. Epic Computer, Fountain Valley, CA.

CIRCLE INQUIRY NO. 191

Talking digitizer

For use in conjunction with the Drafting System 1 software package (model DS1) that produces electronic schematics, this unit is utilized as a data capture station where the operator can digitize non-grid, free hand schematics in a form that is saved on the floppy disk of an attached IBM PC. The attached vocal output unit gives the operator positive feedback as to the data that is entered. The system provides the user with two visual feedback paths as well as a voice feedback path. Design Aids, Laguna Niguel, CA.

CIRCLE INQUIRY NO. 192

Interface package for novices

Stok Pilot allows creation of a front-end supervisor with built-in tutorials to help guide an uninitiated user through a complex application. It makes CP/M transparent to the user, because it can dynamically form and execute CP/M commands at run time. It will run on any CP/M system with a minimum of 24K bytes of memory. The package is available on 8-in. CP/M format disk. Stok Software, New York, NY.

CIRCLE INQUIRY NO. 193

Intelligent multibus-compatible controller

Capable of handling up to 8 ANSI Winchester disk drives and up to 4 3M HCD 75 1/4-in. cartridge tape drivers, the new Rimfire 75 Controller features DMA operation with 24-bit addressing and separate 32-bit ECC word on each sector I.D. and Data Block. It is programmable for 8 or 16 bit systems. It executes commands in six categories: disk and tape drive control, disk and tape drive transfer, dump/restore and specials. Computer Products, Plymouth, MN.

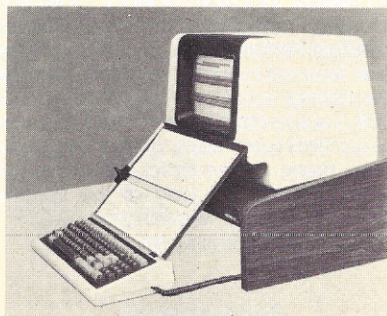
CIRCLE INQUIRY NO. 194

CRT elevator stands

These units raise monitors on a flat plane or in a forward or backward tilt to bring screens into better viewing range for individual operators. The tilt feature also serves to reduce glare on the screen. Elevation allows a copy bridge to be used between keyboard and CRT so reference material is positioned within a single, shorter line of sight. Elevation is adjustable from 2-in. to 6-in. at the front and from 2-in. to 8-in. at the rear. A retainer rail on the platform

OCTOBER 1982

secures the monitor in tilt position. Stands are made of composition wood, finished in walnut woodgrain plastic laminate.



Stands are available in 16-in. and 22-in. widths for CRTs with detachable keyboards. Devoke Data Products, Palo Alto, CA.

CIRCLE INQUIRY NO. 195

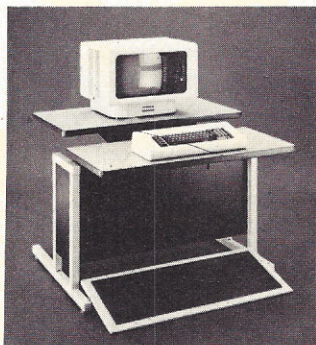
Microcomputer to typesetter interface

El Cid I is an inexpensive means of interfacing most popular microcomputers to the Compugraphic CompuWriter I, and is comprised of a compact box that fits inside the phototypesetter, permits the micro owner to access virtually all of the machine's typographic capabilities from within word processing text files. It uses the industry-standard RS-232 for communicating with the microcomputer. Data Frontiers, Rochester, NY.

CIRCLE INQUIRY NO. 196

Dual adjustable table

Separate, electrically-operated height adjustments for each work surface deliver 500 pounds of lift allowing positioning of large equipment, including pagination, CAD/CAM and graphic design terminals.



Available in 4-ft. width, or 5-ft. width with contoured front work surface, these tables are designed to be compatible with all standard open office modules of those widths. Structural Concepts Corp., Spring Lake, MI.

CIRCLE INQUIRY NO. 197

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| CP/M, MS-DOS | \$129.00 | \$150.00 | \$250.00 |
| TRS-80 Model II | n/a | \$99.00 | |
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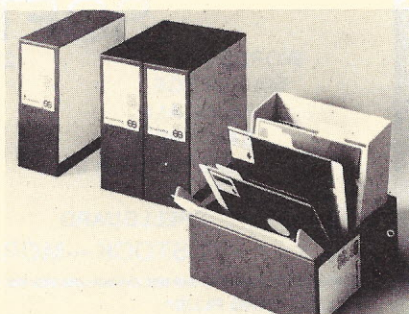


payable, payroll and job costing are included. The system features the NEC PC-8000 microcomputer with 12-in. high-resolution monitor, dual 5¼-in. disk drives, high-speed printer and moderate size memory. Incom Systems, Seattle, WA.

CIRCLE INQUIRY NO. 198

Diskette file

The Vee File holds 20 5½-in. minis. Its modular design allows addition of new units as needs expand. The diskettes fan out for identification and retrieval. Each



unit includes a pressure sensitive label to be applied on the spine, and five inside-tabbed dividers. Eichner Systems, Itasca, IL.

CIRCLE INQUIRY NO. 199

Omninet for IBM PC

Corvus Omnet transporter allows the IBM to be added to a Corvus Omnet network consisting of up to 63 computers of IBM or different brands. Up to 80 million bytes of mass storage can be shared. Corvus Systems, San Jose, CA.

CIRCLE INQUIRY NO. 200

Analysis system

The Executive Alert System was developed to provide a manager with graphic presentation of up to 100 indicators of a business' performance using an IBM Personal Computer with a standard monochrome display. The pre-packaged indicators, and the ability to define indicators specific to one's organization, provides summary data and a graphic indication of the interrelationships of the information being displayed. The System highlights and gives an early warning in areas requiring improvement in performance, procedures or need for system/organizational change. It depicts strengths and weaknesses and will encourage better control of company operations. The System was designed to be used by someone with little or no knowledge of computer systems and no desire to key in more than one or two digits to display output. By meeting this criteria, the system fosters executive use and solves a common complaint of today's managers—they have more data available to them than they can possibly read or absorb. You

can select from a library including subjects such as: Sales by Product Lines, Sales vs. Forecast, Product Profitability, Scrap and Rework, Machine Efficiency, Operating Expenses, Productivity, Employee Turnover, Schedule Performance, and many more. Other features include: weighted average forecasting, scrolling to look ahead or back, year-to-date totals, actual to target values and hard copy output. An easy-to-use menu driven data entry and up-date program are part of the system. Computer Results, Washington, D.C.

CIRCLE INQUIRY NO. 201

Test instrument

The Hawk 4030 combines the features of the six most common data communications test sets into one highly portable, interactive tester. It can test a modem or terminal, features a 20-character data display, and weighs 12 pounds. The Model 4031 ROM PAC programmer is built into the rear protective cover of the Hawk 4030 as an option—and becomes integral to the unit when latched to the rear panel. Field service managers won't have to equip different skill levels with different test set capability; the Hawk 4030 reduces the training time and expense of owning several types of testers. Higher level tech control center managers can create test routines unique to their network for execution by field techs

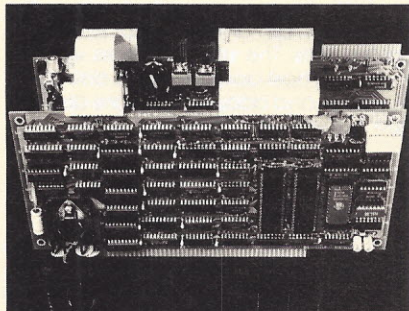


with the depression of only two of the touch-sensitive keys. Programs and test routines can be developed on the Hawk 4030 at the central site for down-loading over data lines to a Hawk 4030 at a remote site. Fifty-one macro instructions, especially designed for data communications testing are built into the microprocessor-based unit for writing routines to test and analyze virtually any data communication system. For ease of operation, program editing is automatic, allowing simple addition and deletion of instructions by the user. The unit can accommodate special IDS ROM-PACs containing an IDS programmed PROM and a user-defined PROM. User-defined programs can be duplicated on the Model 4031 with a single button fail-safe procedure. The Hawk 4030 will perform comprehensive test routines on synchronous, asynchronous, and isochronous

systems at data rates up to 19.2K bps.
International Data Sciences, Lincoln, RI.
CIRCLE INQUIRY NO. 204

S-100-sized board set

Intelligent visual preprocessor, the Pixelcaster is designed to allow development and implementation of image processing algorithms using any computer host. Using the Pixelcaster, virtually all of the information in a video signal, including color, is made accessible to any system communicating via RS-232. Applications include video text recognition, non-contact measurement, robot vision, remote monitoring, and intrusion detection. The unit interfaces via RS-232 and accepts ASCII commands. It features a Z80A CPU and a high-speed memory for storage of up to 1,024 image samples and coordinates of the sample locations. Sample timing is referenced to the NTSC 3.579545 MHz color subcarrier, which makes for very stable sampling of TV images. The 1,024 four-bit pixels can each come from anywhere in the TV signal, including the sync intervals or even consecutive fields. The



order of the pixels transmitted to the host in ASCII is independent of the order the samples are acquired during the TV raster scan. Special X and Y offset registers allow the specified pattern of pixels to be quickly translated about on the image, and real-time interrupts to the Z80A CPU enable processing to be synchronized to events in the video signal. Under program control, the four bits in a sample can encode high-resolution samples (910 per TV line), four bits of amplitude information, or a mixed mode including edge-detection. The four-bit amplitude digitizing is done within a window set by two 8-bit DACs, so amplitude resolution of one part in 4096 is available. Monitor output signals allow programmable viewing of the incoming video, one-bit processed video, four-bit digitized video, and the sample pattern—either in color or black and white. It can be configured as a two, three or four board set. Vision Peripherals, Anaheim, CA.

CIRCLE INQUIRY NO. 205

System—building tool

The DPS-2400 Dimensional Processing System solves data flow bottlenecks

OCTOBER 1982

presently associated with array processors. It allows cost-effective systems to be built using two to eight APs on a single host. The DPS-2400 can also increase the efficiency and throughput of single-AP systems. The unit provides: programmable control outside the host for most AP and data transfer operations; a high speed bus for efficient data transfer between memory, APs, peripheral devices and the



host; a large high speed memory accessible to all DPS devices and the host; extensive support software to assist application development and system integration. The

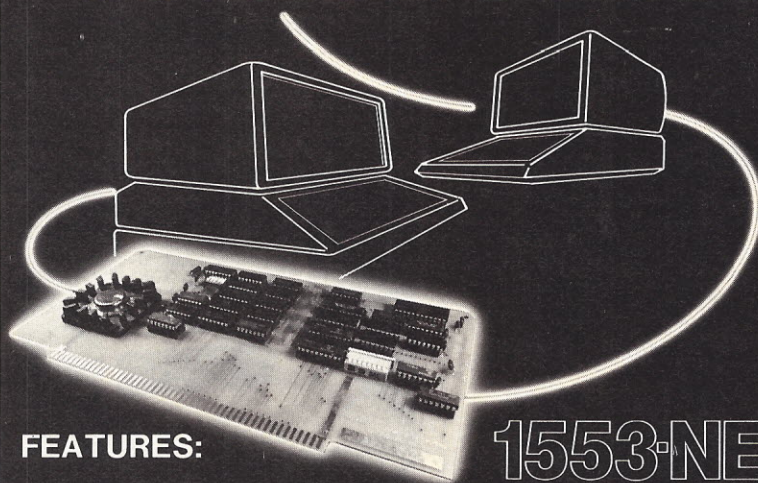
array processor is an economical yet extremely powerful special purpose computer capable of performing complex mathematical computations at speeds many times faster than general purpose mini or mainframe computers. Rather than serving as the central processor in the system, the AP connects to the host as a peripheral processor, offloading these time-consuming computational tasks from the host. The AP has achieved wide acceptance in a variety of scientific applications—among them seismic data processing, image and signal processing and scientific research. However, its usefulness has been limited by the host's ability to effectively control only one AP at a time. Aptec Computer Systems, Portland, OR.

CIRCLE INQUIRY NO. 206

Multiplexer

CMX-808 multiplexer combines fiber optic technology with the latest MSI circuitry to achieve low cost-per-channel for 8 to 16 channel short-haul (up to 2 km distance) multiplexers. The advanced circuitry provides full Auto Baud capability allowing any speed terminal to be connected to

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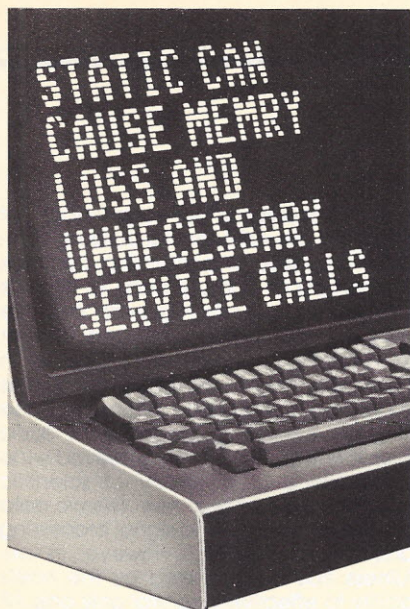
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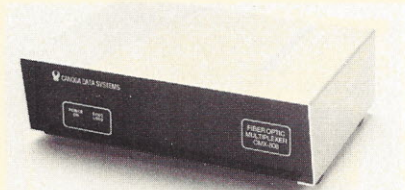
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any port without any hardware or software programming. Further, full code transparency allows the CMX-808 to accept any terminal device, regardless of code structure. Data connections are made through standard EIA RS-232C 25



pin D-type connectors. Full maximum data rates of as much as 19.2 Kbps can be accommodated simultaneously on each channel without data buffering or peak load shutdown. Data bit error rates are guaranteed to be better than 10⁻⁹. The fiber optic transmission cable is much easier to install than conventional cable, yet provides inherent immunity to EMI/RFI, cannot be tapped or monitored by unauthorized parties and provides total electrical isolation between the ends of the data link. Canoga Data Systems, Canoga Park, CA

CIRCLE INQUIRY NO. 208

PERIPHERALS

Hard disk for IBM PC

Corona Personal Hard Disk is a low cost 5¼-in. Winchester disk subsystem that is mounted inside the Personal Computer



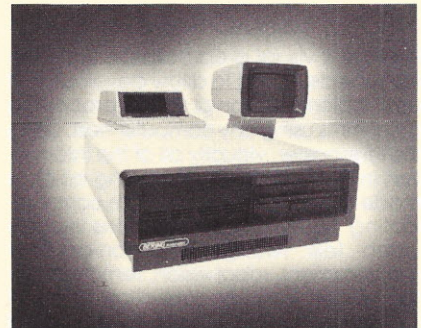
and features multiple operating systems on the same disk. It is available in both 5M- and 10M-byte capacities. Corona, Westlake Village, CA.

CIRCLE INQUIRY NO. 209

Disk subsystem for HP

Bering 4895 consists of a 5¼-in. Winchester drive and an 8-in. floppy drive, packaged in a desktop or rack-mountable, HP-look-alike enclosure. A Winchester configuration is also available. The Bering 4895 emulates the HP 9895A protocol, and is plug-compatible with all HP computers, including

the HP 9800 Series desktop computers, the HP 1000 Series minis, the HP 3000 business computers, the HP 125 and HP 87/85



personal computers. Connection to the host computers is via the standard HP-IB interface, without software or hardware changes. Bering Industries, San Jose, CA.

CIRCLE INQUIRY NO. 210

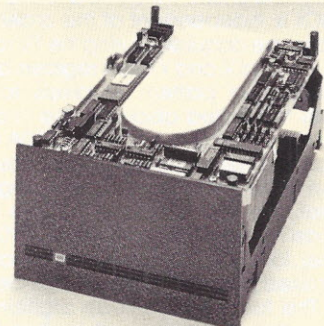
Hard disk for TRS-80 Model III

JHD-III utilizes a 5¼-in. Winchester drive with either 5M or 10M bytes of storage. An LDOS driver is used that allows the storage to be divided into individual logical units. The system comes with the controller, host adapter, hard disk drive, all cables and adapter software diskette. J&M Systems, Albuquerque, NM.

CIRCLE INQUIRY NO. 211

30M-byte 5¼-in. Winchester

Atasi Series 3000, fixed rigid disk drives have large capacity and rapid access time. This combination compliments the new generation of multi-user, multi-tasking systems. In addition to average access



time of 30 mS, the drives feature 3 mS track-to-track access, and an average latency of 8.3 mS. Setting time is 3 mS. Atasi, San Jose, CA.

CIRCLE INQUIRY NO. 212

5M-byte removable storage

ZVX4-AMLYN starter kit is designed to be a primary storage device or backup for a Winchester hard disk. The standard SVA ZVX4 product is hardware-compatible with the Amlyn 5850. Modifications have been made to the ZVX4 support software to increase its drive access capability



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A pocketful of programming—reference guides to all the main computer languages

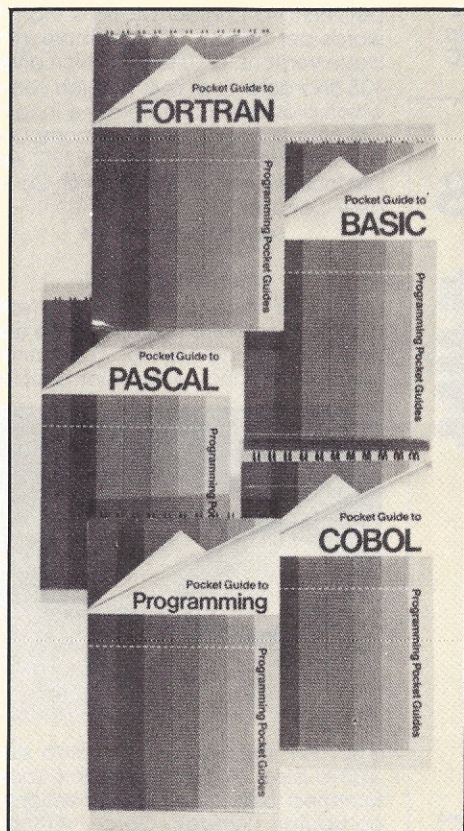
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from 4 to 5. At present, the controller supports DOS 3.3. The Starter Kit is sold as a single component of a memory system. The responsibility for integrating the ZVX4 and Amlyn 5850 into an operational memory system remains with the purchaser. The kit includes a dual density controller card, a data cable, a power cable and documentation. SVA, San Diego, CA.

CIRCLE INQUIRY NO. 213

PRINTERS/PLOTTERS

Desktop daisywheel unit

ComRiter is a desk-top unit designed for word processing with high print quality. A bidirectional carriage helps increase printer throughput. Print speed is 17 cps. Three separate interfaces are built into the ComRiter: Qume Sprint 3, RS-232C

serial, and Centronics-style parallel. Comrex Int'l., Torrance, CA.

CIRCLE INQUIRY NO. 214

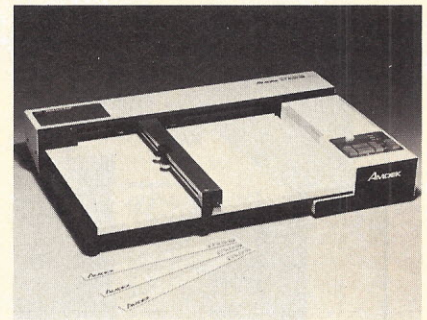
Low-cost daisywheel

The Smith-Corona TP-1, is compatible with major desktop, microcomputers, word processors and small business systems. Delivering a printout at more than 140 words per minute, it is available in two basic versions: a 10 pitch, which gives a 105 character line; or a 12 pitch version, which provides a printable line length of 126 characters. A Centronics compatible parallel interface and a RS-232C serial interface are also available. Smith-Corona, New Canaan, CT.

CIRCLE INQUIRY NO. 215

Four-color plotter

Model DXY has a 10-in.-by-14-in. effective plotting range and figures may be easily drawn using the Control command or Basic command. Maximum plotting



is 2.73-in. per second and step size is .003-in./step. A Centronics interface is furnished to permit easy connection to a computer. Amdek Corp., Arlington Heights, IL.

CIRCLE INQUIRY NO. 216

Redesigned stands

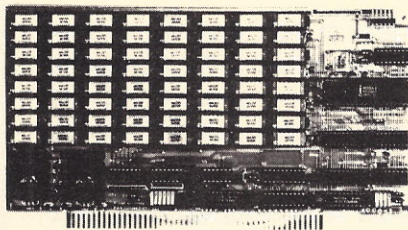
The pedestal and packaging hardware for the Colorplot line of printer/plotters has



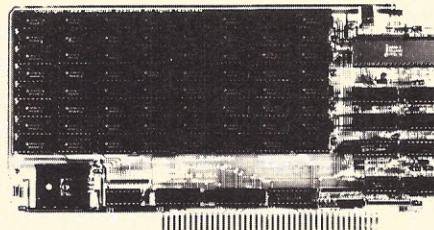
been redesigned. The primary change is the new pedestal, it obsoletes the open-frame type, which has been discontinued from the line. The updated configuration reduces ambient noise. Structural rigidity will also reduce vibration and noise. Trilog, Irvine, CA.

CIRCLE INQUIRY NO. 217

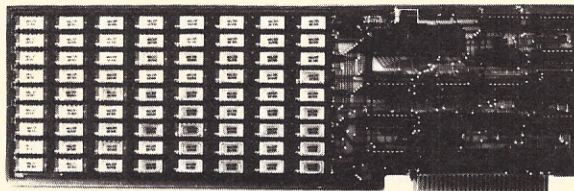
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S-100



TRS 80 Model 2



IBM Personal Computer

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CIRCLE 72 ON INQUIRY CARD



Portables

Continued from page 37

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- Need to manually CLEAR on each new
  run. In DEF mode, begin a run with
  SHIFT,SPACE.
5: " ": PRINT "HOURS"
- Number of activities.
: K=8
- Number of categories.
: L=9
- Number of program variables.
: M=13
- Names of categories and activities.
  Could be deleted here and loaded from
  tape after loading this program. A
  one-character preface has been used
  to indicate groupings of categories
  and activities into sections.
  (E.G. X and Y)
10: A$(M+1)="XSALES"
: A$(M+2)="XMISC"
: A$(M+4)="YSALES"

: A$(M+5)="YADVER"
15: A$(M+6)="YMISC"
: A$(M+7)="GEN OFF"
: A$(M+8)="MISC"
: A$(M+9)="CONSULT"
20: A$(M+10)="EVALUE"
: A$(M+11)="MEETS"
: A$(M+12)="CALLS"
: A$(M+13)="TRAVEL"
25: A$(M+14)="SOTHER"
: A$(M+15)="TYPE"
: A$(M+16)="FILE"
: A$(M+17)="COTHER"
- Begin input routine.
50: C=0
: INPUT "HRS? ";C
- Exit on zero.
55: IF C=0 THEN 120
- Assume a negative entry is a correc-
  tion. Adjust count of entries.
60: IF C<0 LET D=D-2
65: A=0
: INPUT "CAT CODE? ";A
- Test for legality. Note the handling
  of (A=3). This is required for a
  code not in use.

```

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```

70: IF (A<1)+(A>K)+(A=3)=0 THEN 80
75: PRINT "ILLEGAL CODE"
   : GO TO 65
80: B=0
   : INPUT "ACT CODE? ";B
   - Test for legality.

85: IF (B<K+1)+(B>K+L)=0 THEN 95
90: PRINT "ILLEGAL CODE"
   : GO TO 80
   - Output for verification. Items names
     can be omitted from this program, if
     this verification is not needed.

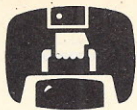
95: F=M+A
   : H=M+B
   : PRINT C;" HRS ";A$(F);"/";A$(H)
   - Use ENTER only if ok. Any character
     will cause a return for reentry.
100: INPUT "OK? ";F$
   : GO TO 50
   - Increase count of entries.
105: D=D+1
   - Accumulate for total hours.
   : E=E+C
   - Accumulate to an activity.
   : A(M+K+L+A)=A(M+K+L+A)+C
   - Accumulate to a category.
   : A(M+K+L+B)=A(M+K+L+B)+C
   : GO TO 50
   - Display totals on exit from entry
     routine.
120: PRINT "ENTS=";D;" HRS=";E
   - Use ENTER only to return for further
     entry. Use any character to exit.
   : INPUT "MORE DATA? ";F$
   : GO TO 140

125: GO TO 50

   - Option to report hours by category
     and activity. Use ENTER only if "yes".
     (This report is essentially to verify
     input.)

140: INPUT "REPORT BY ACT/CAT? ";F$
   : GO TO 160
145: FOR J=1 TO K+L
   : IF J=3 THEN 155
150: H=M+J
   : PRINT A(M+K+L+J);" ";A$(H)
155: NEXT J
   - Option to save data to tape.

160: INPUT "SAVE TO TAPE? ";F$
   : GO TO 170
165: PRINT "LOAD TAPE"
   - Save all numeric time data.
   : H=M+K+L+1
   : PRINT # "DATA";A(H)
   - Option to chain to REPORT.
170: INPUT "RUN REPORT? ";F$
   : GO TO 199
175: PRINT "LOAD TAPE"
   : CHAIN "REPORT"," "
199: END
  
```

Listing 2

```

200: " ": PRINT "REPORT"
      - Reset variables in case this program
        is loaded, rather than CHAINED to.
      : K=8
      : L=9
      : M=13
      : H=K+L+M+1
      - If CHAIN from HOURS or MERGE, data
        is still available.
      : INPUT "READ DATA? ";F$
      : GO TO 210

205: PRINT "LOAD TAPE"
      : INPUT # "DATA";A(H)
      - Compute total in case of RUN,
        instead of CHAIN.

210: E=0
      : FOR J=0 TO K-1
      : E=E+A(H+J)
      : NEXT J
      - Headings for reports.

215: INPUT "NAME/TITLE? ";F$
220: INPUT "DATE? ";I$
      - Begin report.

240: PRINT "CATEGORY REPORT"
      : PRINT "FOR ";F$
      : PRINT "DATE: ";I$
      : PRINT "- "
      - Section heading.

245: PRINT "DEPARTMENT X"
      : H=0

250: FOR J=1 TO K
      - Must include a test for each code
        not in use.
      : IF J=3 THEN 270

255: A=M+J
      : PRINT A(M+K+L+J);" ";A$(A)
      : H=H+A(M+K+L+J)
      - Test for section end. Note these
        must be changed if there are changes
        in the organization of items.

260: IF J=2 THEN GO SUB 375
      : PRINT "DEPARTMENT Y"
265: IF J=6 GO SUB 375
      : PRINT "OTHER"

270: NEXT J
      : GO SUB 375
      : PRINT E;" TOT HRS"
      : PRINT "- "
      : PRINT "- "

290: PRINT "ACTIVITY REPT"
      : PRINT "FOR ";F$
      : PRINT "DATE: ";I$
      : PRINT "- "
      : PRINT "MANAGERIAL"

295: FOR J=K+1 TO K+L
      : A=M+J
      : PRINT A(M+L+K+J);" ";A$(A)
      : H=H+A(M+L+K+J)
      - Test for section end.

```

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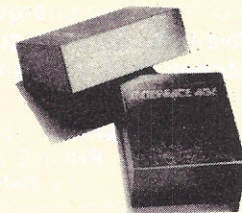
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```

300: IF J=10 GO SUB 375
      : PRINT "SALES"
305: IF J=14 GO SUB 375
      : PRINT "CLERICAL"

310: NEXT J
      : GO SUB 375
      : PRINT E;" TOT HRS"
      : PRINT "-"
      : PRINT "-"

340: INPUT "RUN MERGE? ";F$
      : GO TO 350
345: PRINT "LOAD TAPE"
      : CHAIN "MERGE"," "

350: STOP
      - SUBROUTINE: At end of section,
                    output section total and percent.

375: PRINT H;" SUBTOTAL"
      - Find percent of total.
      : H=INT(1000*H/E+.5)/10
      : PRINT H;"%"
      : PRINT
      : H=0
      : RETURN
399: END
  
```

Listing 3

```

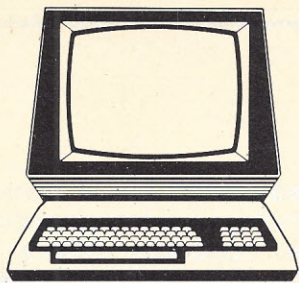
400: " ": PRINT "MERGE"
      : K=8
      : L=9
      : M=13
      - Data from tape will be loaded above
        present data.
405: H=M+2*K+2*L+1
      - Load data to be merged.

410: PRINT "LOAD TAPE"
      : INPUT # "DATA";A(H)
      - Combine data.
415: FOR J=H TO H+K+L-1
      : A(J)=A(J)+A(J-K-L)
      : NEXT J
420: INPUT "SAVE MERGED DATA? ";F$
      : GO TO 430
425: PRINT # "DATA";A(H)
      - Move data down for report or to
        merge more data.

430: H=H-K-L
      : FOR J=H TO H+K+L-1
      : A(J)=A(J+K+L)
      : NEXT J
435: INPUT "MERGE MORE DATA? ";F$
      : GO TO 445
440: GO TO 405

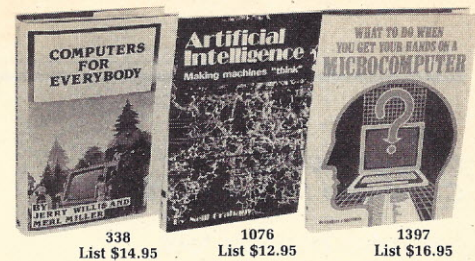
445: INPUT "RUN REPORT? ";F$
      : GO TO 499
450: PRINT "LOAD TAPE FOR REPORT"
      : CHAIN "REPORT"," "
499: END
  
```

OCTOBER 1982

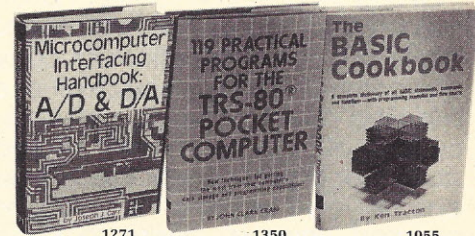


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pervasive business tool.

Of course, protocols for information transfer must also be established. It would be fatal to overlook the fact that combinations of computer systems can communicate with each other *only* if they are supplied with matching software. Because a number of such transmission protocols are available, inter-organizational telecommuting structures can be very confusing. This situation is burdened by most vendors' desire to provide *exclusive* services to customers. Obviously, if a manufacturer's offering can communicate only with its own terminals, a profitable supplementary business opportunity is created.

The American telephone system is gradually shifting from analog to digital transmission. Ultimately, this will make available sophisticated computer-controlled switching methods. Costs for computer communications should decrease and reliability is likely to improve. Currently, noise sensitivity limitations restrict binary communications to 30 characters a second (300 baud), but 120 character capability (1200 baud) is fast-emerging. The Bell System is planning an upgrade that will be billed according to length of message rather than distance of transmission—and will accommodate encoded digital packet switching. Indications are that it may facilitate modemless computer communication.

The telephone network itself originated as many independent, incompatible offerings. Only time and experimentation enabled it to evolve into a moderately flexible system. Because the computer industry really is still in its infancy, a lack of industry standards permits widely discrepant specifications. Protocols may be communicated

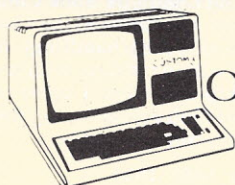
through character-oriented asynchronous transmission, block-oriented synchronous transmission or bit-oriented data link concepts. Different speeds, code sets and format interpretation cause further confusion.

Whereas a local area network—usually supporting communications *within* a facility—can be designed to provide compatibility between unlike systems through linkages of coaxial cable, fiber optic cable and twisted copper pairs of wires, the architecture of a more dispersed network rarely offers such latitude. Not only must the boundaries of inter-organizational communications be universally evident, but intra-organizational communications should be *consciously* structured. Standards for machine dialogue will have to be more standardized. Executed with a long-range objective, the local area network can access other such networks through "gateway interfaces." A tributary of these gateways—and telecommuting in general—will be considerably more direct communication between complex administrative facilities and remote sales and production operations.

Existing theories of formal database management now stretch into the office for text storage and retrieval as well as other more established data applications. Files must be made readily accessible—yet at the same time secure from unauthorized review. The basis for such delicate filing is refined indexing. Schemes should be based on keyword analysis and content—as well as subject, author and date.

An array of systems and services already exist to facilitate storage and retrieval. Unfortunately, most require considerable training. Document files designed to accommodate an inter-organizational telecommuting system must give greater consider-

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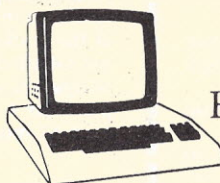


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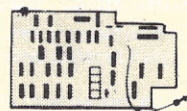
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The image shows a stack of various business forms. At the top is a 'W-4/EE'S WITHHOLDING' form. Below it is an 'INVOICE' form with a sub-header 'AIRBILL'. Under the invoice is a 'STATEMENT' form. Below that is a 'COMMISSION REPORT' form. At the bottom of the stack is a 'PURCHASE ORDER' form. Each form contains various fields for data entry, such as dates, names, addresses, and numerical values.

NEW CUSTOMER

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CITY: ;Addr2\$

STATE: ;Addr3\$ ZIP: ;Zip1:5

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CITY: ;Addr5\$

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150 INTERFACE AGE CIRCLE 76 ON INQUIRY CARD

ation to elements of human engineering and relative security.

The Federal Privacy Act of 1975 places restrictions on the uses and accessibility of centralized databases, but the costs incurred by establishing security during transmission and continuing to maintain the integrity of information increase according to the measure of protection required. Obviously, where operations warrant fewer precautions, telecommuting is more appealing.

The creation of a utopian telecommuting system warrants philosophical projections, but because it is not cost-effective for smaller companies at the present time, a more realistic evolution based on short, medium and long-term goals should probably be sought.

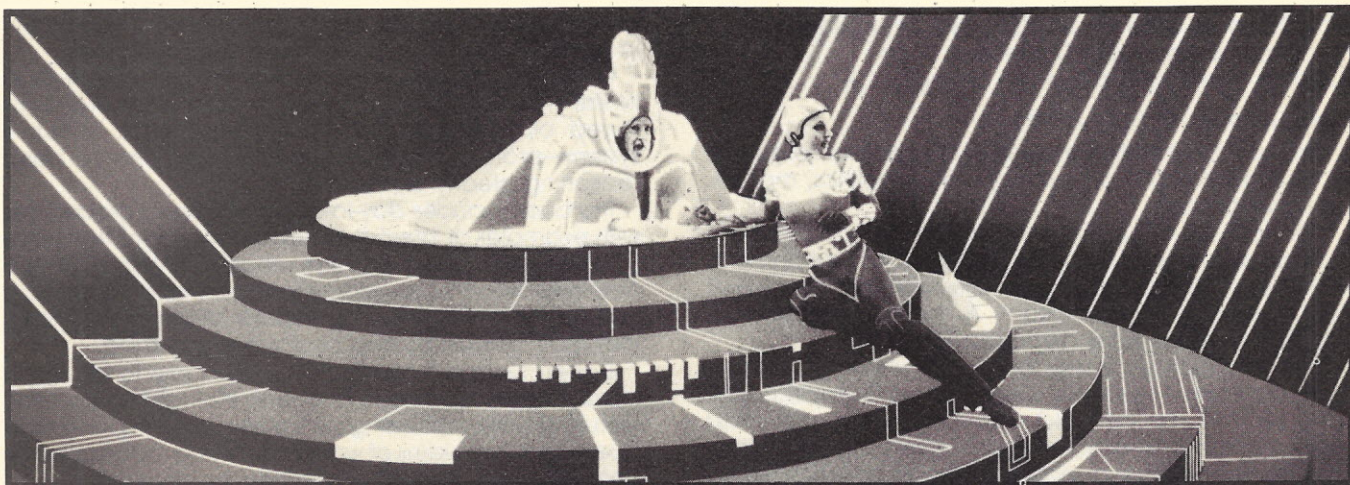
The cost of computing to work increases according to the level of security required during transmission...

The development of capabilities will obviously precede installations. The shift from analogue to digital systems, the increased population of intercommunicating terminals and proliferation of formal networks and public databases will speed the process. Nothing prevents a company from starting small and working up, but consideration should be given to an all-encompassing plan. Future configurations must not suffer by default.

Making programs, data and other resources available to anyone on a network without regard to physical location is not an easy task. This doesn't mean we should elude the advancing technology. History has shown that those who embrace a new technology prosper—those traumatized by it are generally lost in the shuffle. Few can deny that the demand for even more sophisticated information processing will grow intensely as the capacity for gathering, processing and distributing it matures. It really is possible that automobile ignition keys will be replaced by computer turnkey in the not-so-distant future. □

Assistant Editor Dan W. Post has a B.A. in magazine journalism from California State University, Long Beach, and has studied communications at the Colorado College and University of Southern California. He has written articles on a variety of subjects and authored a book on Porsche automobiles.

OCTOBER 1982



Photos © 1982 Walt Disney Productions

In *Tron's* computer world, high priest Dumont (Barnard Hughes) presides over the Input/Output Tower, as he confers with Yori (Cindy Morgan).

Game Buff's Utopia

This column—usually devoted to reviews and/or program listings on computer game software—takes a slight detour this month to pay homage to a newsworthy event for computer game buffs everywhere. Although Walt Disney Productions' new film *Tron* is of particular interest to every Pac Man aficionado that ever walked the face of the earth, its appeal is much broader than that. It is also a big-budget Hollywood movie that actually lives up to its pre-release hype. As a consequence, it brings computer awareness to the public eye more efficiently than 100K courses in computer literacy could ever hope to accomplish.

Combining revolutionary new techniques in filmed computer animation with live-action cinematography (IA May 82), *Tron* achieves a striking visual style that is nothing short of miraculous. Stuffy film critics who whined about the thin storyline have seldom missed the point so completely. Creating its own set of rules for its sci-fi fantasy world, *Tron's* medium is the message. It's an arcade lover's paradise—a Land of Oz journey updated to 1984.

The plot is silicon chip-compact. Jeff Bridges is a computer programmer who has been fired from a huge computer communications conglomerate by a greedy executive (David Warner)—who has also pirated Bridges' video game programs. When Bridges sneaks into company headquarters to search the data files for evidence of the theft, the master control program detects the intrusion. Bridges is zapped by a laser into electronic particles—and transported to a bizarre world that exists inside of the computer.

Bridges must quickly learn the protocol of this new dimension ruled by a dictatorial master program controller. He must also learn to defend himself on a giant game grid where the stakes of losing are much higher than a handful of quarters. In true *Wizard of Oz* fashion, all of the characters from the real world have alter egos in the computer domain.

The film raises some intriguing questions that will become increasingly vital as the automation blitz continues into the 80s: How powerful are intelligent machines? Can they really get out of the user's control? Can human engineers pirate programs from co-workers and conspire to conceal the evidence through a master control? But



Jeff Bridges, Cindy Morgan and Bruce Boxleitner play computer programmers trying to combat the unscrupulous head of the ENCOM communications corporation.



Sark (David Warner) stands in front of his ruler, the Master Control Program, who has banished peaceful computer programs to death.

such questions are not dwelled upon at length. They merely add to the richness of a terrifically satisfying film.

Credit is due to writer-director Steven Liszenberger and special effects engineers Richard Taylor and Harrison Ellenshaw for creating and designing this inspired vision of life in the electronics age. Special note should be paid to Walt Disney Productions for having the courage and foresight to gamble on this risky property, which pays off as an ultra-contemporary, groundbreaking film certain to become a movie milestone. It's eons away from *Alice Through the Looking Glass*. □

The Human Side of Statistical Consulting

by James R. Boen and Douglas A. Zahn
Lifetime Learning Publications, Belmont, CA

Reviewed by Richard Krajewski

This work is not really concerned with statistical consulting. It focuses more on diplomacy, office politics, morale, and negotiation.

Because the book's primary discussion evolves around human relations in a scientific, technical environment, it makes interesting reading for any professional—not just the statistician or consultant. A lively conversational approach helps retain reader attention.

The occasional inconsistency with which the authors address themselves ("We" and "I" were swapped back and forth indiscriminately) conjured visions of the text being dictated into a tape recorder, typed up, then spliced together with hardly a second look. Certainly more work was put into the book than this, but someone left a few loose ends strewn about. These faults are far from serious, but a tighter control might have been more effective.

In general, the book has charm and an entertaining style, while maintaining a serious point of view.

354 pages \$14.95

Machine Organization: An Introduction to the Structure and Programming of Computing Systems

by Charles P. Pfleeger

John Wiley & Sons, New York, NY

Reviewed by Rocky Smolin

In this volume, the author has taken a logical approach to unveiling the electronic mysteries inside our computers. In order to give the reader as broad a picture as possible, he has selected three computers as his foils—one from each of the great families of computers: the micro, the mini and the mainframe. For each of the topics covered in the book, the similarities and differences between the Intel 8080, the DEC PDP-11 and the IBM 360-370 are presented.

Starting his chapters, as all self-respecting computer scientists must, with 0 instead of 1, Pfleeger moves from the block model of the computer to the typical circuit design of digital computers, and an overview of the three machines mentioned above.

Subsequent chapters cover the internal representations of data (including a discussion of binary, octal and hexadecimal numbering systems), machine and assembly languages, flow and control in the execution of programs, the operation of I/O devices, how assemblers, compilers, linkers, and loaders work, and the design and functions of operating systems. The chapters are appended with a list of terms used and questions for review.

227 pages \$23.95

Word Processing and Office Automation: A Supervisory Perspective

by Gilbert J. Konkel and Phyllis J. Peck

Office Publications, Inc., Stamford, CT

Reviewed by Dan W. Post

A practical guide designed to help management executives and supervisors utilize word processing effectively, this book addresses the development of the automated office. Word processors are recognized as having potential for electronic mail, networking, photocomposition

152 INTERFACE AGE

and a host of interfaces with data processing equipment in addition to normal word processing functions.

Written in a dialogue and seminar format by the authors of *The Word Processing Explosion*, it discusses problems faced by management in developing an effective system—practical solutions are presented and the basic reasoning clearly explained.

The book includes day-to-day operational procedures with examples of internal checklists and forms that have proven useful. Of value to the reader are discussions on how new word processing managers and supervisors can handle their changing responsibilities as the system expands. Checklists and charts are provided.

General subject content includes: how to design a word processing system; choosing the right equipment; recruiting word processing personnel; tips to improve daily operations; problems of word processing management; and selection of word processing supervisors.

168 pages \$12.95

Online Searching: A Primer

by Carol H. Fenichel and Thomas H. Hogan

Learned Information, Inc., Marlton, NJ

Reviewed by Steven K. Roberts

The process of searching for an item buried somewhere amidst the world's banks of published literature has undergone a metamorphosis, but the ripples are only beginning to be felt outside the clique of information specialists.

The issue is online information retrieval. This involves the use of a terminal to interactively search bibliographic records comprising a database housed in a large computer system. Searches that once required days of manual digging can now be accomplished in a few minutes.

It has become possible to rapidly conduct a comprehensive literature and patent search on a new process, while compiling a bibliography of the surrounding technology and printing the balance sheets of competing firms. This *four-de-force* of market research usually takes less than an hour.

The information services are not that easy for the beginner to use effectively—nor could they be made so without accepting some sacrifice in performance. For this reason, database vendors routinely offer seminars and training materials, but since those are either system- or application-specific, they are less than ideal as one's first exposure to the field.

It was evidently this realization that spawned this book. Both professionals in the online field, the authors present a jargon-free volume offering an overview of the industry—as well as some hints on getting started and an excellent bibliography of supporting literature.

The book answers the basic questions (What is a database? How much does it cost? Why is online searching worthwhile? How does it work?) with no ill-fated assumptions concerning the reader's prior exposure to computers.

The text is sensitive to its target audience: newcomers to the online field in library, academic and business environments.

The long-promised "information revolution" is taking place and education is the key to fitting in. effective use of the new systems is impossible without a basic underlying grasp of the online field's potential; this work provides it painlessly.

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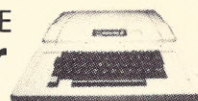
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Early trends are to use the service for project management (to monitor progress and share information despite geographic separation); group authorship (to review new material and direct manuscript changes and consistency); specific inquiries (to pose a question, as one subscriber did about office automation, and have several "substantive" replies within hours); executive decision-making (to gather information to support timely decisions and actions); and market research (to survey and poll other subscribers).

The Source, 1616 Anderson Rd., McLean, VA 22102.

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To use this method requires either a software DES implementation—or a small board or module that is a hardware DES implementation—be added to those hardware devices that do not already include such an implementation, both of which are commercially available. One board or module can be used to validate all software packages that are executed on that device, provided the software package has been suitably protected. The protection consists of periodically authenticating cryptographically-generated validation values.

Advanced Computer Security Concepts, 4609 Logsdon Dr., Annandale, VA 22003.

Software products directory

Over 4,000 proprietary software products are described in the latest edition of the International Directory of Software. In its 1,360 pages, the directory provides a record of the ready-made systems and applications products offered by software suppliers in the USA and Europe.

154 INTERFACE AGE

By providing standardized data about each product and a comprehensive three-way indexing system, the directory is designed to enable computer users to make a scientific appraisal of the software available to them from independent sources. In the directory, data on each product describes its date of origin, installed base, function, terms for purchase or leasing, operational mode, configuration requirements, and the names and addresses of suppliers. Systems and applications software are arranged within 107 categories.

The directory, which describes both systems and applications software offered by independent suppliers in the U.S., Canada, Britain, France, Germany, Australia and other countries, is being marketed in over 70 countries.

Computing Publications, Inc., First Federal Building, Suite 401, Pottstown, PA 19464.

Essential source book

The fourth edition of the *Encyclopedia of Information Systems and Services* is a comprehensive international guide to sources of bibliographic, full-text, numeric and other types of computer-processed information in all subjects: science, technology, business, economics, law, medicine, social sciences, education and the humanities.

The encyclopedia provides vast coverage of information products and their producers, including publishers, professional associations, libraries, commercial firms, networks, government agencies, etc. Also included are consultants and service bureaus that assist the producers; on-line services, time-sharing companies and telecommunications networks; fee-based information services and other concerns that retrieve, process and analyze information for the end user; associations and groups that promote and protect the interests of the information community; and research projects, reference services and similar activities that study and supply information on the field of information.

Revised and updated, the 936 page EISS describes more than 2,030 organizations that produce, process, store and disseminate information products, including 700 new operations identified since the previous edition was published in 1978. Each of the alphabetically-arranged entries is numbered for ease of reference. Up to 17 categories of information are provided in each entry.

Eighteen of the 22 separate indexes provide access to specific types of products, services and organizations found in the main directory.

Gale Research, 700 Book Tower, Detroit, MI 48226.

Computer graphics product guide

An up-to-date international directory and purchasing guide in the field of computer graphics, computer-aided design and computer-aided manufacture is now available in a two volume format, with over 800 pages and 1,500 product entries. It covers over 300 manufacturers and their representatives.

The directory provides an extensive description of each of the products offered, including what the product is and what it is designed to do; available product options; a physical description of the product, including dimensions, where appropriate; a list of compatible products; as well as any features that make the product unique in its category.

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Chart E. System-produced Reports

| Vendor | Inventory on hand (aggregate) | Inventory on hand by departments or product classes | Inventory on order | Inventory backordered | Inventory movement or activity (summary) | Aging of inventory items | Inventory shipped | Physical inventory worksheet (for taking inventory) | Inventory price list | Reorder report—showing | Gross margin report | Other |
|---|-------------------------------|---|--------------------|-----------------------|--|--------------------------|-------------------|---|----------------------|------------------------|---------------------|---|
| Adler Computer Technology | n | n | n | n | n | n | n | n | y | y | y | designed to do daily accounting work for medical practitioners office |
| Advanced Data Systems | y | y | y | y | y | y | y | y | y | y | n | |
| Complete Business Services | y | n | n | y | y | n | n | n | y | y | y | |
| Compumax, Inc. | y | y | n | y | n | n | n | n | y | y | n | Materials Requirements Planning report |
| Compumax, Inc. | y | y | y | n | y | n | n | n | y | n | n | |
| Computerware | y | y | y | y | n | n | y | y | y | y | n | |
| Continental Software | y | y | y | y | y | y | y | y | y | y | y | stock movement analysis current to prior year by month |
| D.B. Software Co. | y | y | n | n | y | n | y | y | y | y | n | stock status; master file listing |
| Dr. Daley's Software | y | y | y | n | y | n | y | n | y | y | n | |
| Data Automation Service Int'l | y | y | y | y | y | n | y | y | y | y | y | warehousing transfer report suggested order listing based on usage, ABC reporting, sales report |
| Data Soft of N.H. | y | n | n | n | n | n | n | n | y | n | n | |
| Golden Kee/Computer Consultants | y | y | y | y | y | n | n | y | y | y | n | |
| Great Plains Software | y | y | y | y | y | n | y | y | y | y | y | |
| High Technology Software Products, Inc. | n | n | y | y | y | n | n | y | y | y | y | inventory turnover by vendor; inventory value by vendor; daily, monthly and yearly sales totals; daily sales tax totals |
| C. F. Kerchner & Assoc., Inc. | y | n | y | n | n | n | n | y | y | y | n | EOQ/PQ8 Report |
| Micro Architect, Inc. | y | y | y | y | y | n | y | y | y | y | y | (*E1) |
| Microcomputer Consultants | y | y | y | n | y | n | y | y | y | y | y | ABC Analysis; spare parts usage |
| Midwest Scientific Instruments | y | y | y | n | y | n | n | y | y | y | n | labor cost, material cost, listing by vendor |
| National Software Marketing, Inc. | y | y | y | n | y | n | n | n | y | y | n | |
| Omni Software Systems, Inc. | y | n | y | n | n | n | y | y | y | y | y | |
| Open Systems, Inc. | y | y | y | y | y | n | y | y | y | y | y | |
| Peachtree Software, Inc. | y | y | y | y | y | n | n | y | y | y | y | department summary MTD report, YTD report |
| Peachtree Software, Inc. | y | y | y | y | y | n | y | y | y | y | y | (*E2) |
| Realty Software | y | n | n | n | n | n | n | n | y | n | n | |
| Relational Systems | y(*E3) | y(*E4) | y | n | n | n | n | n | n | n | n | invoices (purchase detail report), out-of state report |
| SMC Systems and Technology, Inc. | y | n | y | y | y | n | n | y | y | y | n | |
| Software Products Int'l, Inc. | y | y | y | n | y | y | n | y | y | y | y | valuation, translation audit trail, shrinkage, YTD activity |
| Software Technologies for Computers | y | y | y | y | y | n | n | y | y | y | y | minimum quantity (user determined) parts movement YTD and MTD, total value of invoice |
| Structured Systems Group | y | y | y | y | y | n | n | y | y | y | n | audit trail; valuation report |
| Systems Plus | y | y | y | y | n | n | y | y | y | y | y | |
| TCS Software, Inc. | y | y | y | y | y | y | y | y | y | y | n | (*E5) |
| Technology Systems, Inc. | y | y | y | y | y | n | y | y | y | y | y | |
| Westware, Inc. | y | n | y | n | n | n | n | y | y | y | y | Point-of-Sales where invoices are generated; can interface with accounts receivable |

Key

- (*E1) A report writer is provided
 (*E2) Most reports can be printed by bin vendor, item no.
 (*E3) Sales analysis by item
 (*E4) Sales analysis by product category
 (*E5) Total of 23 reports including product performance by department, location, or vendor.

n/a — information not available
 y — yes; feature included
 n — no; feature is not included

Chart F. Information Included in Reports

| Vendor | Revenue | Gross margins by products | Number of items sold | Average cost | Average year-to-date cost | Year-to-date sales quantity | Inventory turn-over ratio | Items on order, not received | Last reorder date | Reorder quantity | Last cost | Returns—quantity | Returns—dollar cost | Receipts—quantity | Receipts—dollar cost | Receipts—dollar sales amount | Items sold, not shipped (backorder) | Last sales date | Other |
|---|---------|---------------------------|----------------------|--------------|---------------------------|-----------------------------|---------------------------|------------------------------|-------------------|------------------|-----------|------------------|---------------------|-------------------|----------------------|------------------------------|-------------------------------------|-----------------|---|
| Adler Computer Technology | n | n | n | n | n | n | n | n | n | n | n | n | n | n | n | n | n | n | |
| Advanced Data Systems | y | y | y | y | y | y | y | y | y | y | y | y | y | y | y | y | y | y | |
| Complete Business Services | n | n | y | y | n | y | n | y | n | y | y | n | n | n | n | n | y | n | |
| Compumax, Inc. | n | n | n | y | n | y | n | n | n | y | n | n | n | n | n | n | n | n | |
| Compumax, Inc. | n | n | n | y | n | y | n | y | n | y | y | n | n | n | n | n | n | n | |
| Computerware | y | n | y | y | n | y | n | y | y | y | n | n | n | n | n | n | n | y | |
| Continental Software | n | n | y | y | y | y | y | y | y | y | y | y | y | y | y | n | y | y | |
| D.B. Software Co. | y | n | y | n | n | y | n | n | y | y | y | n | n | y | y | y | n | y | purchases; quantity purchases; dollar cost purchases; dollar sales amount |
| Dr. Daley's Software | n | n | n | n | n | n | n | n | n | n | n | n | n | n | n | n | n | n | (*F1) |
| Data Automation Service Int'l | y | n | y | y | y | y | y | y | n | y | y | n | n | y | y | y | n | n | |
| Data Soft of N.H. | y | n | n | n | n | n | n | n | y | y | y | n | n | n | n | n | n | n | |
| Golden Kee/Computer Consultants | y | n | y | y | y | y | n | y | y | y | y | y | y | y | y | n | y | y | Optional Bar Code reader completely interfaces to point-of-sale package |
| Great Plains Software | y | y | y | y | y | y | y | y | n | y | y | y | y | y | y | y | y | n | |
| High Technology Software Products, Inc. | y | y | y | n | n | n | n | y | y | y | y | n | n | n | n | y | y | y | |
| C. F. Kerchner & Assoc., Inc. | n | n | n | n | n | n | n | y | n | y | y | n | n | n | n | n | n | n | |
| Micro Architect, Inc. | y | y | y | y | y | y | y | y | n | y | y | n | n | n | n | n | y | n | |
| Microcomputer Consultants | y | y | y | y | n | y | n | y | y | y | y | n | n | y | y | n | n | y | |
| Midwest Scientific Instruments | y | n | y | n | n | y | n | y | y | y | n | n | n | n | n | n | n | y | |
| National Software Marketing, Inc. | n | n | y | y | n | y | n | y | y | n | y | n | n | y | y | y | n | y | |
| Omni Software Systems, Inc. | y | y | y | y | y | y | n | y | y | y | y | n | n | y | y | y | n | y | |
| Open Systems, Inc. | y | y | y | y | y | y | y | y | n | y | y | y | y | y | y | y | y | y | |
| Peachtree Software, Inc. | y | y | y | y | y | y | n | n | y | y | y | y | y | y | y | n | n | y | |
| Peachtree Software, Inc. | y | y | y | y | y | y | n | y | y | y | y | y | y | y | y | n | y | y | |
| Realty Software | y | y | y | n | n | n | n | y | y | y | y | n | n | n | y | n | n | n | |
| Relational Systems | y | n | y | y | y | y | n | y | y | y | y | n | n | n | n | n | y | n | |
| SMC Systems and Technology, Inc. | n | n | y | y | n | y | n | y | y | y | n | y | n | y | n | n | y | n | |
| Software Products Int'l, Inc. | y | y | y | y | n | y | y | y | y | y | y | y | y | y | y | y | y | y | |
| Software Technologies for Computers | y | n | y | n | n | y | y | y | y | y | y | n | y | y | y | y | y | y | (*F2) |
| Structured Systems Group | n | n | y | y | n | n | n | n | y | y | y | n | n | n | n | n | n | n | |
| Systems Plus | y | y | y | y | n | y | n | y | y | y | y | y | y | y | n | n | y | y | |
| TCS Software, Inc. | y | y | y | y | y | y | y | y | y | y | y | y | y | y | y | y | y | y | |
| Technology Systems, Inc. | y | y | y | y | y | y | y | n | y | n | n | n | y | y | y | y | y | y | |
| Westware, Inc. | n | y | y | y | n | n | n | n | y | y | n | n | n | n | n | n | y | y | |

Key

(*F1) As the user defines what information is to be stored, he will also determine what information is included in the reports.

(*F2) Other features include end-of-year clean-out; works with many printers (serial or parallel); has allocation field and does automatic reporting whenever reorder point falls below quantity on hand. (This program has functioned very well to track P.O. numbers against quantities moved.)

n/a — information not available

y — yes; feature included

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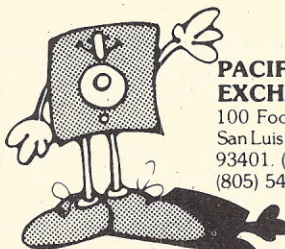
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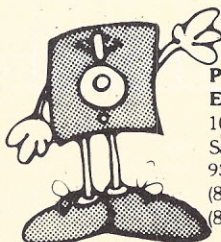
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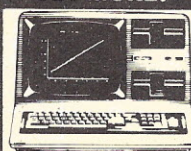
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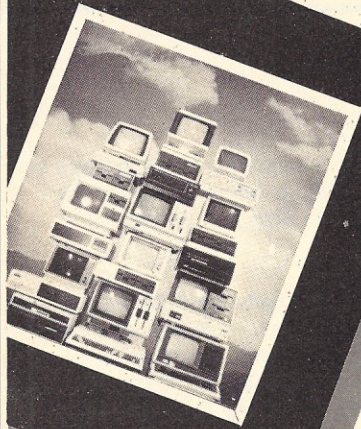
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|--------|----------------------------------|-------------------|--------|----------------------------|---------|
| 1 | 3M Static Control | 140 | 56 | NEC Information Systems | 77 |
| 2 | 800-Software, Inc. | 59 | 57 | NISS | 36 |
| 3 | A.E.I. | 132 | 58,302 | New England Business | 110,146 |
| 4 | Amdek | 19 | 59 | Nexus | 149 |
| 5 | Amersand, Inc. | 96 | 60 | Omega Sales | 101 |
| 6 | Anvil Cases | 94,95 | 61 | Personal Computer Age | 89 |
| 7 | Archives | 31 | 62 | PacketInfo Corp. | 144 |
| 8 | Artificial Intelligence | 136 | 63 | Professional Systems Corp. | 93 |
| 9 | Aspen Software | 138 | 64 | QIS | 97 |
| 10 | Atari | 20,21 | 65 | Qantex | 4 |
| * | CPAids | 25 | 66 | Quicktax | 134 |
| 12 | California Data Corp. | 96 | 67 | Qume | 70 |
| 13 | Chang Labs | 111 | 68 | Rana Systems | 52,53 |
| 14 | Columbia Data Products | 75 | 69 | Rocky Mountain Software | 109 |
| 15 | Columbia National | 33 | 70 | Savvy Marketing | 30 |
| 16 | Commodore | 78,79 | 71 | Select Information Systems | 22 |
| 17 | Computer Books Club | 147 | 72 | Semidisk | 142 |
| 18 | Computer Furniture & Accessories | 133 | * | Sinclair Research | 43 |
| 19 | Computerworld International | 54 | 73 | Software Publishing | 38 |
| 20 | Comrex | 86 | 74 | Small Systems Engineering | 46 |
| 21 | Corvus | 5 | 75 | Standard Software | 137 |
| 22 | Cromemco, Inc. | 1 | 76 | Southern Computer Systems | 150 |
| * | Cybernetics | 87 | 77 | Stoneware Microcomputers | 119 |
| * | Data Dynamics Technology | 90,91,103,141,145 | 78 | Strobe | 16 |
| 23 | D&W Digital | 102 | 79 | Systems Plus | 108 |
| 24 | Digital Graphic Systems | 37 | 80 | Tarbell | 113 |
| 25 | Digital Marketing | 13 | 81 | Teletex | 1FC |
| 26 | Discount Software Group | 115 | 82 | Transnet | 145 |
| 27 | Dynax | 81 | 83 | VLSI | 139 |
| 28 | Ecosoft | 144 | 89 | Univair Int'l | 72 |
| 29 | Electronic Control Technology | 97 | * | University Microfilm | 159 |
| 30 | Electronic Specialists | 116 | | | |
| 31,300 | Epson | 40,41,51 | | | |
| 32 | Franklin Computer | 28,29 | | | |
| 33 | G.R. Electronics, Ltd. | 4 | | | |
| 34 | Hayes Microcomputer | 27,84 | | | |
| 35 | Hewlett Packard | 9 | | | |
| 36 | HiTech Systems | 99 | | | |
| 37,38 | IBC | 3 | | | |
| 39 | IBM | 10,11 | | | |
| 40 | I.U.S. | 15 | | | |
| 41 | Independent Peripherals | 116 | | | |
| 42 | Industrial Micro Systems | 107 | | | |
| 43 | International Micro Systems | 63 | | | |
| 44 | Integrand Research | 130 | | | |
| 45 | JRT Systems | 127 | | | |
| 46 | Jini Micro | 145 | | | |
| 47 | Jonas Ltd. | 35 | | | |
| 48 | Kybe Corp. | 83 | | | |
| 49 | LNW Research | 7 | | | |
| 50 | Leading Edge | IBC,BC | | | |
| 51,301 | Lifeboat Associates | 76,150 | | | |
| * | Link Systems | 73 | | | |
| 52 | Meridian | 148 | | | |
| 53 | Microcomputer Consultants | 69 | | | |
| 54 | Micro Craft, Inc. | 131 | | | |
| 55 | Mini/Micro '82 | 125 | | | |

RETAIL

| | | |
|----|------------------------------|-----|
| 85 | American Square | 135 |
| 86 | CPU Shop | 129 |
| 87 | Compushack | 157 |
| 88 | Computer Discount of America | 153 |
| 89 | Marymac | 127 |
| * | NRI Schools | 80 |
| 90 | Olympic Sales | 143 |
| 87 | P.D.S. | 155 |

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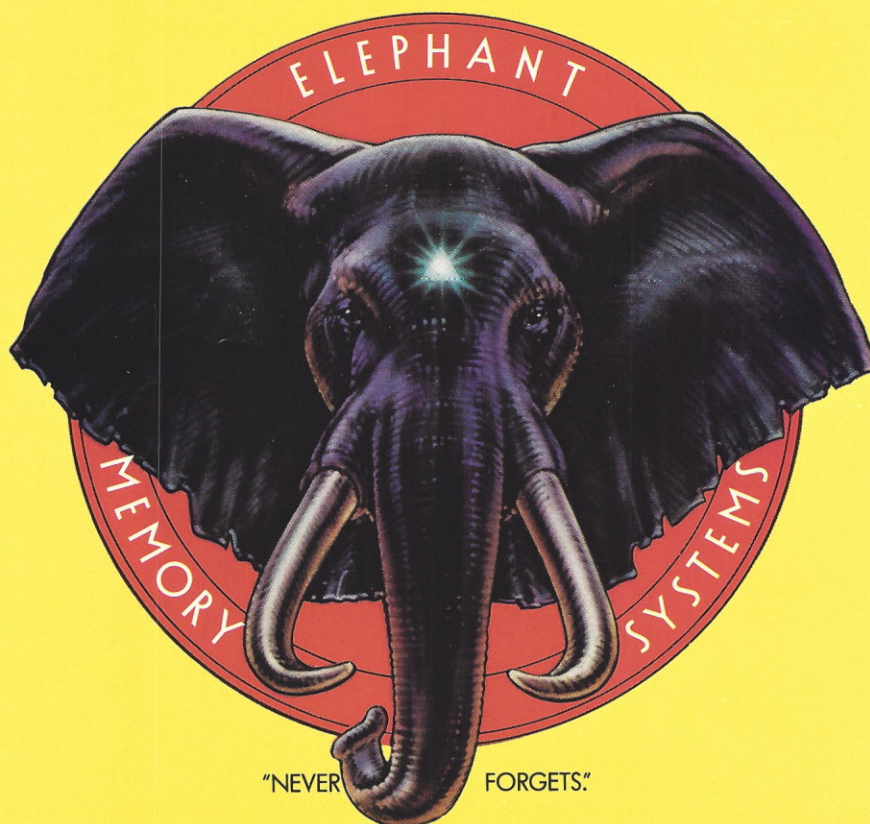
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|----|----------------------|-----|
| 92 | Addmaster | 158 |
| 93 | Computer Plus | 158 |
| 94 | Data One | 158 |
| * | Hanco Software | 158 |
| * | Interface Age | 159 |
| 95 | Micro Management | 158 |
| 96 | Microsette | 158 |
| 97 | Pacific Exchanges | 158 |
| 97 | Pacific Exchanges | 158 |
| 98 | Stok Software | 158 |
| * | University Microfilm | 158 |
| 99 | University of R.I. | 158 |

*Manufacturer requests factory-direct inquiry.

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